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PLATO AND THE LIBERAL ARTS: A PLEA FOR MATHEMATICAL LOGIC

IT is usual to deplore what is called the grammatical reification of concepts, that is that sort of thinking which finally mistakes the symbols for the symbolized. And it was indeed a skilful critic who not so long ago rid us of the most dangerous of such reifications, that of sensations themselves, by leaving us with nothing but adjectives on our lips and the blind act of substantial adoration in our hearts and minds. For he proclaimed it a final truth that neither in sensation nor other symbol can substance do more than appear as adjectivally qualified. The rules of the symbolic theater are absolute and tyrannical: all masks are adjectival and the mask which would play at being substance is disallowed. For the liberal artist the rule is: no second impositions and no singular intentions.

But when one tyrant arises many others follow, for there are many possible tyrannies. One such has decreed that the theater is a serious affair; it shows forth what is the case and all dramatic criticism is nonsense. There is no difference between first and second impositions and no difference between first and second intentions.

In the midst of these restrictions there has been no lack of professionals in tolerance, rhetoricians whose rules change with the circumstances of each play, or those who simply pretend to have no rules at all.

Again there are those for whom dramatic art consists in descending into the street, and, unseen, thoughtlessly pinning names on the good people engaged in their daily business. For them there is no necessary connection between symbol and symbolized. For them all mystery disappears in the brutal assertion of the arbitrariness of each atomic symbolic act. Iconoclasts, they pretend they cannot worship symbols but only what they mean.

Let us turn then to the one who so accurately described tyrants and rhetoricians and violent men of all kinds, and who, in virtue of his condemnation of symbolic license and its counterpart symbolic tyranny, first constructed a doctrine of symbolic freedom. They are crude people who say there is only the letter; they are presumptuous people who say that the letter without the spirit is dead and forget to add that the spirit without the letter is impotent. Now Plato, although he also, as in the Cratylus, ridiculed the grammatical reification of concepts, never stopped pointing out that there must always be a proportion between symbol and symbolized which is the thread of discovery and knowledge in all true science. He would not be at a loss to understand that the irrational relative to the rational number, that is within the universe of discourse of the decimal system, is an indefinite unending symbol as opposed to a recursive unending symbol, and that in mathematical logics, where arithmetic is defined in terms of subject and predicate and so-called logical operators, the irrational has its place apart, as do also such transcendentals as true and false, a place marked off by the very nature of the symbols, almost as if second impositional existences moved in harmony with what as first impositions they signified. To go further, there are times when symbols in second imposition seem to create, or at least to find, what in first imposition they might signify. An example of such symbolic spontaneity is Peacock's symbolic algebra where the formal extension of the sym-

bolic structure suggests a formal extension of the number system. The principle here used to extend the domain of number is called the principle of the permanence of equivalent forms and has been restated by Hobson in four rules:

(1) Every operation which is represented by a formal expression involving the unextended class of numbers, and which does not result in the representation of a number of the unextended class, must have a meaning assigned to it of such a character that the formal expression may be dealt with according to the same rules as would be applicable if the expression represented one of the unextended class of numbers.

(2) An extended definition of number must be given, such that a formal expression, as in (1), may represent a number in the extended sense of the term.

(3) A proof must be given that for numbers of the extended class the same formal laws of operation hold as for the unextended class.

(4) Definitions must be given of the meaning of greater, equal and less in the extended domain of numbers, these terms being taken in the ordinal sense. (Hobson, *Theory of Functions of a Real Variable*, I, p. 121.)

By these four rules do we pass from an equation such as $3 - 2 = 1$ where the minuend must be larger than the subtrahend to such a general form as $x - y = z$ whose very generality, representing also such an equation as $2 - 3 = z$. finds and defines a new domain of number.

Such procedure depends on the conviction that grammar is not an arbitrary art or science, and that if it hangs on logic and the reality which it names just so do logic and the reality named hang on it. This role is assigned to grammar by Plato in the figure of the divided line; for the lower half is divided into two parts of which the upper consists of plants, animals and the fabrications of man, and the lower part consists of the images, shadows of these things, their reflections in polished surfaces and in water. These surfaces are the grammar of nature. Just so is there a grammar of the liberal arts which is a reflection of what it names. In the Theaetetus

Socrates, examining the definition of science as reason added to right opinion, asks what this reason (λόγος) could well be. One sense that is advanced is "to make known clearly one's thought by means of vocal expression with verbs and nouns and as in a mirror or in water to reflect one's opinion in the vocal flow." In the Sophist these metaphors are made more explicit, and what might seem to pertain to one art or science is now shown to pertain to two: grammar and rhetoric.

It is to be remembered that in the Sophist the art of production is divided into human and divine production, and that each of these in turn is divided into the production of real things and images (ἴδωλα) of them. Now both human and divine image-making are divided again into copies (εἰκόνα) which are true images and simulacra (φαντάσματα) which are false images, or in terms of the interpretation given here, distorted images. The examples of images of divine make are those that have already been mentioned: reflections in water and in polished surfaces, shadows and dreams. In respect to divine making Plato does not at this point make clear what are copies as distinct from simulacra. But if it is permissible to introduce the developments of the Timaeus, which is Plato's formal treatise on divine making, the designations would be as follows. The realities of divine making are the ideas, sensible objects are the divine copies, and the simulacra are the reflections and shadows which were more loosely classified in the Sophist. For Timaeus in speaking of the account he is about to give of the production of the visible universe as an imitation of the eternal model says: "Now concerning the copy and its model the following distinctions must be made. Since reasonings are akin to those things which they explain, those then which pertain to what is fixed, sure and clear to the intellect must be fixed and unchangeable—as far as it is possible for irrefutable and invincible reasonings to be so. And no one of them must fail to fulfill these conditions. But those which pertain to what

is copied from this model, since it is a copy (εἰκών), are likely reasonings in proportion to the others: as essence is to becoming, so truth is to belief." And so it might seem that as the copy is to reality so is the simulacrum to the copy.

In the case of human making the text of the Sophist is more immediately explicit. The simulacra are the usual product of the fine and liberal arts which distort the objects of this imitation. Such for example are paintings in perspective and discourse of all kinds. In an earlier dialogue, the Gorgias, the distinction between the true and the distorting arts seems fairly simple. On the one hand medicine, gymnastics, legislation, and justice, and on the other the false arts of flattery, cooking, toilette, sophistry and rhetoric. But the more sophisticated doctrine of the Sophist would seem to describe all distortion in terms of rhetoric and to intimate, by the very examples given, that distortion necessarily follows the use of grammar. For though a painting not in perspective would be a copy rather than a simulacrum, Plato is rightly doubtful if it would be an adequate symbol.

The figure of the divided line, in the light of these later dialogues, takes on more meaning. The polished surfaces are the grammatical symbols, the reflections themselves belong to the art of rhetoric which, taking appropriate objects from the world of real things, shows forth by means of them that real world itself. And so the lower half of the divided line indicates the correlation of grammar and rhetoric in all symbolic thinking. Water as reflector is in second imposition, as reflecting it is in first imposition, as water it is in zero imposition.

Plato names the four divisions of the line beginning with the lowest, conjecture, faith, discursive knowledge and intelligence. Considering the equation $x - y = z$, and following the account given at the end of Book VI of the Republic, it is possible to tell a tale of the trivial arts. The equation is known to be satisfied for any numbers (positive of course) x and y,

if $x > y$. But the grammatical form $x - y = z$ does not state this condition that x must be greater than y. It suggests more, and it is possible to *conjecture* that the reflection, however much it must distort its object, is not wholly in vain. Now if numbers are represented by lines, and if lines are endowed with direction as well as length, something is known to exist in the sensible real world which corresponds to the reflection, and to *conjecture* is added faith. With respect to the first section of the upper half of the divided line, the lines with direction are used as images themselves, and on the hypothesis that the equation represents the general form of such lines, it is possible to reach the formulation of certain rules of operation whose fundamental axioms are expressed by the four rules given above as stated by Hobson. According to the fourth and last section, it is from the intuition of the principle of the permanence of equivalent forms that the axioms and rules of operation are deduced. It is in this way that the equation $x - y = z$, in suggesting the validity of such an equation as $2 - 3 = z$, has given birth to negative numbers. But further in considering this process, if the first two sections of the figure of the divided line seemed to embody grammar and rhetoric, the middle two would seem to embody rhetoric and logic, the link between zero and first intentions; the last two together the link between second intentions and their predicates; and the last alone, those final predicates of which something will be said later.

So far only those relations between symbol and symbolized had been introduced which had to do with impositions. The distinctions were here more or less clear-cut. An object, without losing its own existence in zero or second imposition is taken in first imposition to stand for another object in zero imposition. A pool of water without ceasing to be a pool of water and without losing its character of reflector, lies still the image of cloud and sky. But the simplicity of this kind of imitation

where object stands for object, and which at times seems so purely conventional as to lead some to suppose that grammar is a wholly arbitrary art, gives way to a more subtle kind of imitation or symbolization within symbols themselves. It is this theory of what might be called inter-symbolic imitation which involves the notions of predication or participation, and of the different intentions.

It is proved in the first part of the Parmenides that the symbolic relation of subject and predicate which shows forth the imitation of what the predicate signifies by what the subject signifies is an indefinable one. It is as primitive as the imitative act of signification itself, except in so far as it seemingly depends for its symbolic representation on this act of signifying. The problem of participation has always remained a problem and nearly as Plato left it in the Parmenides, although many have since tried to solve it in ways which struck deep at the mystery but finally failed. Some have tried to force the imitator to give birth to the imitated, the proper name to the common name, the subject to the predicate, the singular to the universal, only to have on their hands a monster which is neither one nor many. Others have transformed it into an heroic drama of narcissism: the subject struggles with its negative the predicate, only to find that its antagonist is a reflection of itself within its other self.

Now Plato took pains to show he was aware of the dependence of this fundamental theory of knowledge on symbolic structure and form. In the Theaetetus he makes fun of those gross persons for whom being is only that which they can seize with their hands, who lay hold of subjects and ignore predicates. And then he denounces the more subtle heresy of those who ignore subjects and reduce everything to predicates interpreted as relatives without possible relata. In the Sophist it is pointed out that just as the supreme science of dialectics consists in knowing the possible combinations of the five highest

forms, so the science of grammar consists in knowing the principles of the combination of subjects and predicates.

In fact the symbolic act which consists in the juxtaposition of subject and predicate is so fundamental that even where it is seemingly denied it reappears, purified perhaps or generalized. The imitation of the common name by the proper name is always with us. Now this imitation can take two forms: (1) the more general form of participation, and (2) the more restricted form of identity. In other words the copula indicates either imitation which implies the otherness of imitator and imitated or a special kind of imitaton where this otherness is absent, that is, identity. This last kind might be called a limiting case where imitation really disappears. In the Parmenides these alternatives are clearly stated: "But to participate in the One," says Parmenides, "it is clearly necessary to be other than one. For otherwise that would not be participation, but being one itself. For being one is impossible for anything except the One itself." Again in the Sophist these two forms are yet more clearly distinguished: "It must be acknowledged then that movement is same and not same. And there is no use fussing about it. For when we say it is same and not same, we are not speaking in the same way. But when we say it is the same, we speak thus because of its participation in *same* with respect to itself, but when we say it is not the same, it is because of its community with other by which it is separated from same, and made not that but other, so that it is also rightly said to be not the same." In other words, movement participates in same, but is not identical with same.

The recent development of symbolic languages has not changed this primitive division. It is true the theory has had its iconoclasts, zealots of the quantification of the predicate, who wished to destroy the art of mimicry by permitting no imitation except identification, but like all sects they have dis-

appeared. The modern theory of variable and function has indeed, without, however, departing from the tradition, produced the daring spectacle of the proper name's imitating the common name, not only in the particular way peculiar to the proper name, but also in a general way, so that the proper name by means of the variable, without ceasing to be proper, tries to become a common name. In mythical terms it is as if the variable imitated the function, much as time in the Timaeus imitates eternity, by an unending becoming and ceasing to be. Through the variable the members of a class attempt to become the class itself; the singular is transfigured by the general. Such symbolic structures as 'Scott is the author of Waverly' which seem to defy this division have yet turned out to be only slightly restricted examples of participation. Russell's definition of the definite description proves this:

$$\alpha = (\imath x)P(x) = D_f(\mathsf{E}^{\imath})(x)[(P(x) \equiv (x = y)) \cdot (\alpha = y)].$$

or more generally for sentences the type 'The author of Waverly was a poet':

$$Q(\imath x)P(x) = D_f(\mathsf{E}^{\imath})(x)[(P(x) \equiv (x = y)) \cdot Q(y)].$$

Curiously enough Russells definition uses both participation in the first sense, and identity. The existential operator is nothing more than the admission of what Plato states very clearly in the Sophist, namely that the copula implies participation, but not being. Nor is it perhaps irrelevant in passing to notice that Plato would seem to concur in the usual symbolic definition of identity,

$$(x = y) = D_F(F)(F(x) \supseteq F(y)).$$

For in speaking of same and other, the dialogue in the Sophist runs this way:

Stranger: But I believe you'll agree that beings are always said to be either in themselves or in relation.

Theaetetus: Certainly.

Str.: But other is always spoken of with respect to another, isn't it?

Theaet.: True.

Str.: That would not be true if being and other did not differ completely. But if other participated in the two forms as being does, at some time some one of the others would be other without being other with respect to other. Now we have surely established that whatever is other, is necessarily this very thing which it is only with respect to another.

Theaet.: That is true.

Str.: Other must then be counted a fifth among the forms we have chosen.

It is apparent here that other is proved to be not identical with being by showing that it does not have the same predicates. The Stranger considers it evident that if there were no predicate which belonged to being without belonging to other, they would be identical. It is by discovering that being participates itself in two forms which exhaust all beings, that is the form *in se* and in relation, and that participation in the first by other would contradict its nature, that the non-identity of being and other is established.

But this passage presents another theory, that of substance and accident. That this is the historical locus of that distinction is attested by the fragments of Eudemus preserved in Simplicius' Commentary on Aristotle's Physics. "Plato," he says, "first introduced this distinction," τὸ διασον, he calls it. It appears not only in this passage of the Sophist, but also again in the Philebus: "There are two somethings, the one in itself, the other always desiring something else."

In Plato this distinction remains as the participation by being in two forms. Whether it can be explained as the participation of being in the two forms same and other is a problem we have not been able to solve. It would be the most acceptable and most seemingly Platonic solution, but the disjunctive way of saying 'beings are always said to be either in

themselves or in relation' is unfortunate and discouraging. In any case it is Aristotle who overburdened the general symbolism of imitation handed down to him by trying to make the general framework of this symbolism carry a distinction between substance and accident, substantial and accidental predication, without a corresponding expansion of the general symbolic structure itself. Consider the symbolic descriptions (for it is that kind of definition which is relevant here) he gives in the Categories of the notions, substance, accident, universal, particular.

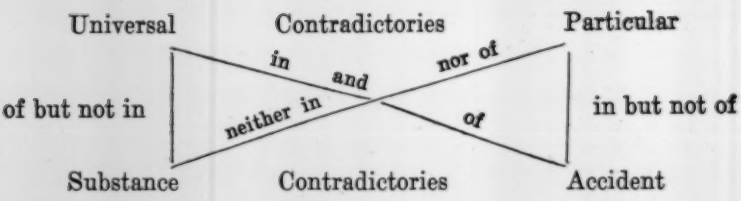
1. Universal, that which is said of.
2. Particular (or singular), that which is not said of.
3. Accident, that which is in.
4. Substance, that which is not in.

The first two of these alone seem to concern symbolic structure. The first is the description of the predicate, the second is generally considered to describe a subject which cannot be used as a predicate. Now substance and accident seem not to concern the symbolism at all, but to have to do with a particular relation which is called inherence. As yet nothing extraordinary seems to have been done. It is with the final step, the crossbreeding of the two orders, inherence and predication, that is violated the principle of the necessity of proportion between symbol and symbolized, the principle, as it will be defined later, of symbolic freedom which must characterize the liberal arts.

The fatal combinations are as follows:

1. Universal accident, both of and in.
2. Particular substance, neither of nor in.
3. Universal substance, of but not in.
4. Particular accident, in but not of.

Or to use an Alexandrian mnemonic design:



It is now evident that predicates can be either universal accidents or universal substances with only the brutal classification of the categories to indicate by a special act for each predicate which is the case. Particular accidents cannot be predicated at all. Any attempt to do so would be absurd since it would indicate either participation in the particular accident by the subject or identity of the subject with it, if the fundamental symbols of imitation are to be preserved; such a predication can at best be expressed by a particular relation having the general symbolic form of all other relations such as '*a* inheres in *b*' or R(a, b). Particular substances have come the final subjects of all predication. The Aristotelian dictum "All predication is of first substances" is made clear, as also indeed the reduction of general propositions in modern mathematical logic to an implicative or conjunctive relation between predicates. But even in this case the theory of proper names, or at least of prime matter which is involved, leads to difficulties which will have to be examined later.

It is not necessary to belittle the attempt here made to build a theory of substance and accident nor to ignore the profound insight which Aristotle showed. But it is not strange that, faced with an inadequate symbolization of substance and accident, science turned to the necessary connection between predicates and ignored the distinction of substantial and accidental predication. Thus the existential operator of modern mathematical logic operates on either subject or predicates of different levels, and these seem to be the only divisions of being as such that are symbolized.

If then the theory of substantial and accidental predication seems to be without adequate symbolic representation, that is, if it introduces a general logical or metaphysical distinction without a corresponding general grammatical distinction, does it not seem, however, that at least it is possible to identify first substances and the final subjects of predication and that at this point Aristotle was well within his rights to use the general grammatical distinction between proper names and common names to express the distinction between first substances and some other form of being? This theory supposes that there is a class of symbols which can only be subjects and never predicates, that grammatically there are such things as proper names. Now to deny such a rule or convention within symbols would be symbolic tyranny of a well known sort. And that is a specious objection which has been raised by another symbolic tyrant, namely, that the purely logical distinction of a subject which can never be a predicate means nothing if we leave out the sensuous condition of permanence in time. For the general grammatical distinction indicates that there is a possible general metaphysical one, and such an insight is perfectly valid whether or not there exists a definite method of determining which sensuous conditions correspond to this distinction. In this case, moreover, the tyrant was particularly limited because his symbols were sensations over which man has not the same power or with which he has not the same freedom as with the notations of the liberal arts. And these sensations he imagined to be more restricted than they are, since he limited them to second imposition.

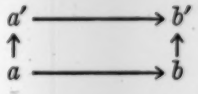
This problem, however, the so-called problem of the proper name, is not so easily disposed of. Having defined the proper name as the grammatical counterpart of that which can only be a subject and never a predicate, it remains to be seen what such an entity really could be and what it really could symbolize. For, like moral actions, symbolic acts have a dynamic deter-

minism of their own, all the consequences of which are never foreseen and whose history is a grammatical dialectic which has never been written except in the degraded form of histories of materialism. This paper has referred already to those iconoclasts, tyrants who assert in all the Renaissance violence of their natures the atomism of symbolic acts. It is not the proper place here to develop the consequences of such an apparent denial of the dynamism of symbols, in order to see how negation is here affirmation and what a startling history might issue from such brutal beginnings. But there can be no doubt that a complete study of the liberal arts should include such a compendium of the necessary development of tyrannies, much as Newman has described the historical development of theological heresies as a logical dialectic from their first premisses.

The war of tyrants has thriven in modern times around the connotation and denotation of proper names. Some declare them to be predicates, some that they have no meaning, as if they were not symbols at all, but, by some miracle that only empiricists are aware of, become what they are said to denote. We cannot pretend that we have been able completely to disentangle the final theory of the proper name in Plato's dialogues, so well aware was he of the dangers of symbolic license and symbolic tyranny. His bitter remarks about those who take hold of subjects and ignore predicates have already been mentioned. But later on there appears in the same dialogue, the Theaetetus, a passage that might well apply to proper names. It has been suggested to Socrates that science is reason (λόγος) added to right opinion. He thereupon describes this theory in terms of physical and grammatical myths. It is as if the universe were composed of elements which had no other determinations than their names, to which no predicates could be attached. Known by the senses alone, they are the objects of right opinion. Reason arises with aggregates of these elements, and the totalities of these aggregates are as predicates, functions of

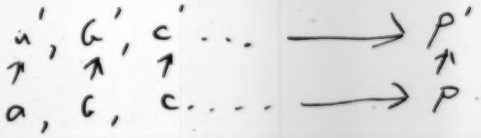
unity as they have been called. But how does reason arise out of the totality of irrational elements? The elements are such as they are because they are not composed. In the same way their totality is either composed of elements or itself indivisible. In either case, it must have the same property as the elements themselves. Therefore, such an emergence of the rational from the irrational, of reason from sense, of predicates from final subjects, seems contradictory.

Before moving to the resolution of this problem, it is proper to retrace the symbolic steps that have been taken. From the imitation of symbol and symbolized, the discussion passed to the imitation of symbol by symbol which is called predication. But it is only now that the full significance of this last sort of imitation has become apparent. It has been the fashion recently to perform miracles on the following pattern [1]



where a and b are the symbols respectively of a' and b' the things symbolized. Then the relation a to a' and of b to b' expresses the first sort of imitation described in this paper, that of naming. The relation symbolized by a to b which signifies the relation of a' to b' is the second sort of imitation, predication. But the symbolic pattern here laid bare and implicit in the descriptions given is insufficient, for the distinction between subject and predicate, between a and b, between a' and b' has only been arbitrarily indicated, and does not arise from the formal nature of the pattern itself. A modification must be made as suggested by the myth of Plato let $a, b, c \ldots$ be the proper names of singulars $a', b', c' \ldots$. Then let predication be the proportion between the relation of $a, b, c \ldots$ to their totality P and

[1] See Scott Buchanan, "An Introduction to the *De Modis Significandi* of Thomas of Erfurt," in *Philosophical Essays for Alfred North Whitehead.*



$a', b', c' \ldots$ to their totality P′. This can be represented by the following pattern

$$\begin{array}{ccccc} a', & b', & c' & \cdots & \longrightarrow P' \\ \uparrow & \uparrow & \uparrow & & \uparrow \\ a, & b, & c & \cdots & \longrightarrow P \end{array}$$

where the totalities P and P′ are respectively the grammatical and logical predicates, that is grammatical predicate and that which is symbolized by it, idea. As we have seen, these totalities can be interpreted in two ways, either they are the sum of their parts, or they are indivisibles themselves. Of course, this dilemma faces more especially the totality symbolized, for the relative arbitrariness of grammar permits it to escape the immediate difficulty only to find it again at the heart of each of its symbols as Plato notes in the Theaetetus, when he paraphrases the problem in terms of letters and syllables and words. Now this dilemma of part and whole throws us back again on the difficulties of participation discussed in the Parmenides, difficulties which led us to regard participation as an inexplicable primitive symbolic act. The meaning of the myth of the Theaetetus seems to be this. The spatial whole and parts represent the continuum which is one aspect of grammatical symbol; the non-spatial whole and parts are exemplified in the relation of a word and its letters, and this is the other aspect of grammatical symbol, particularly as it appears in the liberal arts. But this second relation presupposes the first, and they both imitate a third which envelopes and transcends both: the relation of singular to universal. For the universal can be considered as the sum of the singulars; it is furthermore discontinuous with the sum of the singulars; and finally it can be said of each of the singulars. It is this last quality which differentiates it. And so it may be said among other things that space and time in the relation of their wholes and parts imitate and symbolize the relation of singulars and universals. In view of these things, a third pattern would be

There must be a more satisfactory analysis or pattern possible in mathematical notation, but at present this gross procedure is all that we can conjure up.

It is now interesting to note what here happens to rhetoric. Its role as a middle term between grammar and logic becomes clearer. Just as Kant's middle term between the intuitions of sense and the categories of the understanding, that is, imagination, has a threefold division, so many stages by which it passes from one to the other, on the one hand partaking of the sensuous intuitions and on the other of the pure categories of the understanding, so rhetoric passes from grammar to logic in a series of steps; (1) in its immanent grammatical aspect of the part-whole relation within each grammatical symbol, and in particular the part-whole relationship within the continua of time and space. This relation is one of imitation. In the case of time and space, each part, imitating the whole, becomes in turn a whole to parts, and this imitation to infinity of a part's becoming a whole, itself the sum of parts, is the essence of the continuum. In the case of words, one aspect is continuous, they are in space and time. The other is that of part and indivisible whole, the discontinuous aspect which is that of word in relation to its syllables and its letters where there is a discontinuity between the whole and its parts, and each part imitates this relation as a whole itself distinct from its parts until a part is reached which has no parts, except perhaps under the aspect of continuum. This sort of discontinuous part-whole relation exists also in the relation of sentences to words and of the whole composition to sentences. This discontinuity involves signification and hence (2) this is rhetoric in its transitive grammatical aspect. The symbol names the symbolized. (a) The proper name imitates the singular, or more completely

explicated the proper name imitates the sensations which in turn imitate the singular. (b) The common name imitates the universal. For this reason it is proper to say that the common name is a bundle of proper names, but tyrannical to say that this constitutes the universal. The common name as a bundle of proper names is the grammatical imitation of the universal. (c) And so the relation of proper name to common name as subject and predicate imitates the relation of singular to universal. Nominalism is the grammatical imitation of realism. (d) The general composition of sentences into a whole imitates the unity of ideas. (e) Persuasion is the imitation of an idea by individuals *by means of* a composition or sentence or other symbol. (3) Rhetoric in its logical aspect is the imitation of universals by singulars, otherwise called the subsumption of singulars under universals.

It is now necessary to return directly to the problem of proper names, or finally to the problem of singulars. Though one might not suspect it, the outlines of the answer to this fundamental question are found in the Sophist and the Timaeus. Stated briefly proper names symbolize the result of predicating of non-being, as non-being is described in the Sophist, and as predication is described in the Timaeus. The final subject which cannot be a predicate is the subject not appearing in symbol, and proper names symbolize the result of predicating of this subject, they symbolize the products of divine making, they are the results of the predication of non-being as a subject which is characteristic of divine making. *Ex nihilo omnia fit.* From the subject not appearing in symbol result by divine predication the symbolic subjects which cannot be predicates. This first sort of final subject, that not appearing in symbol, is described in the Sophist under the name of non-being. It is called the inexpressible (ἄρρητον), the irrational (ἄλογον) and scholars suspect it is connected with the irrationals of the tenth book of Euclid's Elements. It is so named because it can only be defined by an infinite negative conjunction of all predicates.

Yet it is that which determines all finite beings. For no matter how many predications are made of it to bring forth singulars, it still remains; let the number be infinite, an infinity is left. The negative conjunction is the matrix of affirmative conjunction. Aristotle was later to identify these with prime matter and primary substance, defining prime matter as that in which all predications inhere, and primary substance as that in which all predications inhere or of which they are only made, according to the meanings of *in* and *of* which have already been discussed. But since predication itself is a different primitive symbol in Aristotle from predication in Plato, the non-symbolic subject and the symbolic subjects of Aristotle have led to problems for Western thinking which were not Platonic. By at least one modern scholar they have been considered, in Aristotle's hands, as fateful symbols throttling Western science until they were transformed and dissolved by the great theologians of the later Middle Ages.

To repeat in a more precise manner what has just been said, there are two kinds of subjects: (1) subject not appearing in symbol, (2) subject appearing in symbol. This second kind can in turn be divided into two: (1) subjects which cannot be predicates, and (2) those which can be. This last division is indicated grammatically by the distinction between proper names and common names, that is, proper names are those symbols which can only be subjects, common names are those which can be predicates as well, and which in modern logical notations are always symbolized as predicates, without any distortion of meaning. Thus "All men are mortal" is translated $(x)(P(x), Q(x))$. But such a treatment of proper names and common names is not complete, as the modern theory of types has suggested. First there are subjects which are never predicates: these might be called the absolute proper names. Second there are those subjects which can be predicates with respect to a class of predicates which are said to be of the same level, and they can be symbolized as predicates in such cases even

where they appear as subjects. With respect to other classes of predicates, however, they are not capable of such a reduction, and they may thus be called relative proper names. And so it is said that predicates of the third level can only be predicated of predicates of the second level, etc. This process may be pursued on any level finite and transfinite, since second intentions arise as by necessity from the grammatical plenum. Beyond this there arise predicates which can never be subjects. No pure instance of such predicates seems to be known. The five forms of the Sophist or the transcendentals of the Mediaevals are approximations since in general they can only be predicated of each other, and in the rare cases where certain logical words can be predicated of them, they in turn can be predicated of these logical words, so that they defy the law governing other levels in this way and also in the fact that they can be predicated of all other levels below, and no levels seem to use their immediate predicates unless it be the ideal of which they are only the approximation. But it is not important here to interpret these entities, to say that they symbolize this or that, but rather to look at the structure itself, to consider the possibilities of grammar, to wonder at the pure form of symbols.

If now this form is considered in terms of making and no longer just analytically in its parts, that is, if subjects and predicates are considered as moments in the act of predication, the symbolic structure takes on new significance. It was pointed out that divine making consisted in predicating an affirmative conjunction of predicates (perhaps transfinite in number) of that which is defined by the negative conjunction of all predicates. The result of this divine predication is the appearance of subjects which cannot be predicates, or absolute proper names, from non-symbolic subject. Since any predication of the non-symbolic subject leaves it as it were untouched, it is this subject which helps define the subject appearing in symbol, and this in turn defines the other. *Materia prima concreata est cum singulari.* But each predicate in turn can be considered as

created, it too becomes a proper name, and this is its second intentional aspect. Thus, the relative proper name is to the absolute proper name as a reality to a copy of divine making. *Processio Verbi in divinis dicitur generatio.* And so the non-symbolic subject appears on every level; viewed from above it is still non-being, inexpressible and irrational. But viewed from below at every level, it is seen as a predicate and is finally defined in this sense as one of the five forms: non-being is other. Those predicates alone which are subjects to no others are uncreated, and for this reason those forms which approximate this ideal are called acosmic.

It is now apparent that human predication within the liberal arts is the human imitation of divine making. Man tries to reconstruct by multiple predications the divine predication which brought forth the symbolically appearing subject. It is in the liberal arts that human predication most closely approximates the divine. In the useful and fine arts, the artist manipulates only predicates of one or two levels and never the acosmic predicates which are beyond all levels. Further in these arts, the artist's predications continually change the subject, while in the liberal arts the subject remaining unchanged the predicates are multiplied indefinitely in the attempt to exhaust the knowledge of the subject. The first are strictly arts in that the predicate and subject exist always together as an individual whole, the liberal arts are sciences as well in that they present their subject and predicates analytically separated in linear array.

The result then of this tedious account which has tried to follow the Platonic analysis of the liberal arts, from the arbitrary grammar of the Cratylus through the expansion of the necessary grammatical forms in the Sophist and the Timaeus, is to show these arts their rightful place and to give them a proper definition. The liberal arts are those arts the freedom of whose notation makes it incumbent upon them to represent,

by their formal symbolic structure, the structure of all the other arts and sciences and to manifest the acosmic principles of all knowledge. To be free the liberal arts must be literal. *Per incarnationem est redemptio.* So that this freedom of notation is a responsibility as well as a privilege. It means necessary distinctions in all the arts and sciences will look for corresponding necessary distinctions within the symbolic structure of the liberal arts. *In unum Dominum Filium Dei unigenitum.* A necessary distinction is one involving universal grammar, not arbitrary grammar nor particular meanings. For within the liberal arts themselves the distinction in logic must have their embodiment in grammar. With rhetoric as his guide, the liberal artist must fashion grammar after logic, and embody logic in grammar, to the end that his visible symbols manifest the necessity of the invisible ideas and the necessity of their freedom. Necessity of their freedom, for in the attempt of the liberal arts to be reflexive, to express their own necessity, to buckle back upon themselves, as in logical syntax, it is to be expected, and semantics is experiencing this very thing, that the acosmic predicates ever escape the circle, mockingly to prove their independence.

The Platonic treatment of the liberal arts has given rhetoric the place of midwife. For it has everywhere supplied the connection between terms, it has everywhere made possible symbolization, and everywhere brought forth serial orders. It is as if rhetoric were the action by which being (logic) appeared (grammar). Or it is as if the practical syllogism were nothing but man's placing (rhetoric) himself (the singular) under a law (the universal) by reflection (the grammar of freedom). Only recently a Platonist has applied these arts to man in the trilogy Being, Thought, Action. The nineteenth century was riotous in the use of triads, all of which are analogous to logic, grammar, rhetoric. To name only some of them: unity, plurality, totality; possibility, existence, necessity; noumena, phe-

nomena, cognition; nothing, being, becoming; quality, quantity, measure; and many others. But if everywhere these vestiges of the liberal arts are found, if it is this fact which constitutes the unity of human making, doing and thinking, a diversity of systems arises from the different fundamental symbols of predication used by rhetoric to construct its symbolic copies of reality, that is, what predication means, and also from the rhetorical rules which prescribe what can be predicated of what.

In the *Republic* Plato describes three cities of predication. The first is the city of the limited predication of certain fundamental useful arts, the city of the huntsman; the second is the city of unbridled predication, the city of virtuosi and sophists; the third is the ideal city of well-ordered predication, the city of the philosopher-king. The attempt of the disordered city to cure itself of the ills of superabundant predication and to return to the innocent state of the huntsman results in tyrannies. The history of such cities then becomes an oscillation between symbolic license and symbolic tyranny which appears in all the arts and sciences. Such in our day is the oscillation between liberalism and fascism or communism in the political arts, between Cantorians and intuitionists in mathematics, between romanticists and classicists in literature, between positivists and idealists and Aristotelians within the liberal arts themselves. But there exists an ideal for the arts, represented by the third city, and this ideal is symbolic freedom. This symbolic freedom can only be attained under the governance of the liberal arts. It is they alone which contain a free notation, which can express a hierarchy of distinctions within themselves, so as to furnish for all the arts each its peculiar form and its proper rationale, and finally to establish for themselves, beyond the relativism of many systems, the necessity inherent in their own nature. *Scientia Dei est futurorum contingentium.*

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HUSSERL'S PHENOMENOLOGY[1] AND THOMISTIC PHILOSOPHY

THE starting point of phenomenology is pure consciousness, the stream of "cogitationes" with the world as "cogitatum." From the very beginning it is Husserl's intention to discover an a priori that is independent of psychology, an a priori that differs from that of Kant in that it combines elements of form with elements of content in an indubitable intuition of essences.

The first part of Husserl's "Logische Untersuchungen" is devoted to the refutation of psychologism. He repudiates psychologism in order to free logic from the then current psychological connotations and thus to reestablish its autonomy. He criticises Mill, Spencer, Wundt, Benno Erdmann, Lipps, and others for psychologising logical objects and for treating logical forms as though they were actual experiences and factual temporal data. In doing this he attempted to lay a new foundation of pure logic and epistemology. He tried to demonstrate that the sphere of logic is an ideal sphere, and that logical objects cannot be reduced to "real" ones.

In the second volume of "Logische Untersuchungen" he proceeds to inquire into the phenomenology of knowledge. It is here that he develops his new method of phenomenological analysis which he later presented more comprehensively in his "Ideas of a Pure Phenomenology and a Phenomenological Philosophy."

Husserl's positive contribution to contemporary philosophy, then, consists in these two achievements: (1) the radical analysis of pure consciousness and (2) the elaboration of the phe-

[1] Phenomenology, being defined as the science of phenomena, uses this term in its original rather than the Kantian sense. A phenomenon is "that which displays itself." However, Husserl does not restrict the phenomenal nature to material objects. "Phenomenon" simply refers to the fact that something is present to me. This something is understood by Husserl, as we shall see, as the transcendentally purified phenomenon which is intuited by a transcendentally purified consciousness.

nomenological method. In his analysis of pure consciousness he reverts to Descartes, also accepting the latter's affirmation of the ego as an immediately evident certainty. He is now prepared to approach the realisation of his ideal of philosophy as the ultimate and most rigorous science. It was Descartes who made the absolute evidence of the "ego cogito"-principle the starting point for a transcendental philosophy. But, says Husserl, Descartes did not realise the full importance of his discovery of transcendental subjectivity. Nevertheless, in his second "Meditatio" he introduced the problem of knowledge in the form of the problem of the transcendence of consciousness. Unfortunately, Descartes failed to apply his method of general doubt to the transcendence of the "mind" and of the empirical personal subject. He was satisfied with applying his method to the sphere of external transcendences. In order to attain to the really indubitable "ego cogito" the Cartesian equation of "mens sive animus sive intellectus" must be discarded, and the "I" as subject of empirical cognitions must be eliminated. What Husserl calls the phenomenological "reduction" consists in the process of eliminating, of "putting out of play," of "bracketing" the entire natural world together with our beliefs, opinions, convictions or prejudices in regard to existing objects. If rigorously applied this method of phenomenological "reduction" will ultimately yield the answer to the epistemological question: "How is it possible for us to gain knowledge of the transcendant?" What remains as the result of "phenomenological reduction" is the sphere of pure and indubitable consciousness.[2]

What Husserl actually demands is a radical change in our "natural" attitude toward the real world, a change which he describes as "the phenomenological ἐποχή." We are re-

[2] The specifically "transcendental reduction" purifies psychological phenomena by divesting them of their reality-character and by disengaging them from the "real world." What remains is the "pure" phenomenon, the pure essence which may be "seen" ("angeschaut") intuitively.

quested to abstain from attributing the character of reality to any of our conscious experiences and judgments. The purpose is a methodological one: the phenomenological "ἐποχή" facilitates the accurate description of "pure consciousness." Husserl admits that the "natural attitude" has its justification: it is the point of departure for all other attitudes, just as the material object is the foundation of all other objects. But at the same time he calls the "natural attitude" "naïve" because it takes the existence of the world for granted and does not see the problem of transcendence. It avoids the difficulties involved in an epistemological inquiry.

By means of the phenomenological "reduction" we have now discovered an indubitable sphere of transcendental subjectivity, in which the whole stream of my "cogitationes" is immediately given. The world is also given as the "cogitatum," but it is no longer limited to the actual world, but includes as "cogitata" all possible objects, all ideal objects, all so-called impossible objects, all phantasms, dreams, hallucinations, etc. It is Husserl's contention that this phenomenological attitude is superior to the "naïve" one because it may be utilised for epistemology, logic and metaphysics.[3]

The phenomenological attitude reduces the seeming oneness of given objects to infinite manifolds of experience. In the naïve attitude I perceive one tree, one table, one proposition. But when I consider the table as a unity persisting through time and change I am not aware of the fact that a series of eye-movements, of changes of bodily position, of changing aspects and accidental influences accompany my perception of the

[3] Husserl's speculation at this point clearly indicates a Platonic and idealistic tendency. Objects of cognition are not only "real" things but they may be ideal "objects," species, mathematical relations, ethical postulates, etc. "Gegenstand ist fuer uns ueberall ein Titel fuer Wesenszusammenhaenge des Bewusstseins" (Husserl, *Ideen zu einer reinen Phaenomenologie und phaenomenologischen Philosophie.* Halle, 1928, p. 302).

table. Generally speaking, every object corresponds to a unity of consciousness and is given in manifolds of experiences.

Every consciousness, according to Husserl, is "intentional," it is consciousness *of* something, it is consciousness of an object.[4] Although we cannot properly say that phantasms or mere appearances "are," they nevertheless do "appear," and they do appear in the same manifolds of consciousness as the existent things. Phenomenological reflection reveals to us the sphere of "pure" consciousness as distinguished from "psychological" consciousness. Phenomenological reflection also reflects on my acts of perceiving, imagining, judging, striving, willing, etc. These states of consciousness are "absolutely" given in "pure immanence." Whatever is intended in pure phenomenological reflection is absolutely given and given without reservation.[5] We have already seen that this sphere of pure reflection or purified consciousness is the result of the universally applied phenomenological "reduction."

Now in all the transformations and variations that a thing may undergo, there persists an identity and unity of certain essential features which cannot be transformed. Phenomenological description is the description of such essential features. There are various degrees of evidence, and the final goal of phenomenological description is the achievement of an adequate

[4] This statement does not apply to sensations and simple affections. Not implying consciousness of something, they do not have the character of intentionality. Brentano, on the contrary, attributed the character of intentionality to sensation as to any other form of consciousness.

[5] "Die Thesis der Welt, die eine zufaellige ist, steht gegenueber der Thesis meines reinen Ich und Ichlebens, die eine notwendige, schlechthin zweifellose ist. Alles leibhaft gegebene Dingliche kann auch nicht sein; kein leibhaft gegebenes Erlebnis kann auch nicht sein: das ist das Wesensgesetz, das diese Notwendigkeit und jene Zufaelligkeit definiert" (Husserl, *Ideen*, etc., p. 86). "Ich mag zweifeln, ob je ein aeusserer Gegenstand existiert, ob also irgend eine auf solche Gegenstaende bezuegliche Wahrheit richtig sei: aber an dem jeweils erlebten sinnlichen Inhalt der Wahrnehmung kann ich nicht zweifeln" (Husserl, *Logische Untersuchungen*, Halle 1913, II. 2., p. 238).

evidence of the phenomenon. It is, therefore, the highest ambition of phenomenology to become a purely descriptive essential science.

As such a "science of essences" (Wesenswissenschaft) phenomenology is akin to geometry and arithmetic. It aims at the recognition of the essential predicables that belong to individual objects. Unlike Kant, Husserl does not attempt to deduce categories from a forced unity imposed by the intellect or by apperception, but he intuits essential laws and properties in the different spheres of psychic experiences, of thoughts, volitions, emotions, calculations, and other factual data. These laws are subject to variation and change correlative to any given class of forms and objects with their corresponding terminologies. Husserl distinguishes several major spheres which are dominated by different categorical and essential laws: the spheres of mathematical and formal logic, the sphere of the natural sciences, the biological, historio-sociological, the axiological-ethical, and the psychological spheres. This complex structure takes the place of Kant's simplified scheme as presented in his three Critiques. A final synthesis in the form of a structural systematisation of these several spheres appears as a distant goal the attainment of which is anticipated by Husserl as the result of a strict application of the methods of exact phenomenology.

But exact phenomenology is more than a method: it is an independent science, a science that does not presuppose any knowledge that is not derived from its own field. This "transcendental phenomenology" is primarily concerned with the "ego cogito" and the "cogitatum qua cogitatum." But in order to establish a relationship between the solitary ego and a sphere of inter-subjectivity or the transcendental ego-all, Husserl has to make use of Theodor Lipps' theory of "empathy." In this way he tries to overcome the subjectivism of an enclosed egology. From the essential science of the single ego

and the ego-all we pass on to possible systems of knowledge and an order of fundamental concepts of a priori disciplines. The factual world of which I form a part, is but one of an infinite number of possible worlds. By virtue of the unlimited capacities of human knowledge the distant goal of transcendental phenomenology may ultimately be reached and phenomenology thus be recognised as the source of a system of ideal possibilities and of all possible methods and sciences.

If we now compare and confront Husserl's phenomenology with the tenets of Thomistic Scholasticism and Neo-Scholasticism, the question might be asked whether there is any inner justification for linking the two systems together in a philosophical discussion. The answer is contained in the fact that phenomenology and Neo-Scholasticism share in the common ancestry of the "philosophia perennis" and that Husserl himself admits his indebtedness to the Aristotelianism of his teacher Brentano.[6] From Brentano Husserl the mathematician learned that philosophy could be practised as a genuine and exact science. Frequent controversies between adherents of the two schools have been carried on in a friendly spirit.

By comparing some of the essential doctrines of the two systems it will be possible to determine to what extent they agree and where their ways part. We have just heard that Husserl's phenomenology considers the capacities of human reason and the sphere of human knowledge as practically unlimited. It is true, he admits that the adequate recognition of truth is an infinite task, but it is a task which the philosopher has to approach and approximate and in whose ultimate realisation he firmly believes. Thomas Aquinas agrees with Husserl in that he, too,

[6] "Ohne Brentano haette ich kein Wort Philosophie geschrieben." "Dieses Wort, das ich frueher einmal geschrieben habe, gilt auch heute noch," sagte zu mir E. Husserl im Januar 1932 (cp. Maria Brueck, *Ueber das Verhaeltnis Edmund Husserls zu Franz Brentano*, Wuerzburg 1933, p. 3). Brentano considers it as Husserl's most fundamental error that he attributes being to non-real objects and to universals.

considers this approach the normal philosophical attitude. It is the normal way as far as natural reason is concerned. But Thomas Aquinas would emphasise his conviction that the term "infinite task" implies that the goal can never be reached in "statu viae," and that therefore every philosophy will ultimately remain fragmentary. He would deny, furthermore, that truth is nothing but an idea whose realisation is visualised as the result of a process of infinite duration. He would meet Husserl's way of reasoning with the assertion that the fullness of truth exists, and that there is only one knowledge that comprehends and comprises it: the infinite quietude and plenitude of Divine knowledge. Thomas Aquinas determines what can be known by human reason and what can be known by faith and revelation, and he definitely draws the line of demarcation between reason and faith or between philosophy and theology. These are thoughts, of course, which are unfamiliar to modern philosophical speculation. It is true that Kant insisted that the limitations of natural reason be clearly marked before it can begin to operate and function properly. But to Kant as well as to modern philosophy in general it seemed a matter of course that this demarcation of boundaries was itself one of the proper functions of an autonomous reason. To be sure, to solve this task satisfactorily, reason might find it necessary to withdraw temporarily to some Archimedian point outside of itself. For Thomas Aquinas transcendental criticism in Kant's and Husserl's sense would have carried little meaning. Husserl again would designate as "naïve" the Aristotelian realism of Thomas. As soon as this "naïve attitude" was relinquished and the naïve confidence in an unquestioned universe of realities vanished, it was but a natural consequence that epistemology had to become the principal philosophical discipline. Husserl, too, takes his start from what he considers an unshakable epistemological foundation. Making use of Descartes' method of general doubt, and of Kant's philosophy of the transcendental subject, he

arrived as we have seen at the sphere of "pure consciousness" as the terra firma and a sound basis for his "philosophia prima." Thomas Aquinas again would maintain that Husserl's ideal of knowledge is realised in Divine cognition where being and knowing are one whereas for us they are apart.

Would Thomas Aquinas, then, consider all criteriology as being without value? By no means. There is room in Thomistic philosophy for a critical examination of the instruments of cognition and for a critical analysis of the foundations of philosophical certitude. Any manual of neo-scholastic philosophy gives due consideration to criteriology. But Thomas Aquinas himself could well afford to treat epistemology as a "cura posterior." His task consisted essentially in collecting, examining, sifting and ordering the sum total of knowledge that was available in his time. The minds of his contemporaries were stirred and confused by the manifold new sources and documents of knowledge as contained in the teachings of the Arabs and Jews and in the works of the rediscovered and neo-platonically discolored Aristotle. For this work of comparison, compilation and synthesis Thomas made use of all suitable means that were at his disposal.

Both Husserl and Thomas Aquinas are convinced that truth exists objectively and independent of the seeker and knower. But when it comes to the inquiry into the nature of the "prima veritas" and the "prima philosophia" their ways part again. For Thomas God is the principle and criterion of all truth. The object of the "prima philosophia," therefore, is God. After having elaborated the idea of God and the modes of His being and knowledge, he proceeds to the definition and description of the relationship that exists between the essence, existence and knowledge of created beings and things and the Divine essence, existence and knowledge. In this connection Thomas discusses the capacity of human beings for knowing God, knowing themselves and knowing other created beings. Episte-

mology, the starting point of most modern philosophers, appears thus as part of a general ontology. In the Thomistic system all philosophical problems and disciplines become part of ontology. Each being has received the quiddity, mode and essence of its existence from God and, correspondingly, also its specific measure and manner of knowing and striving, its specific grade and type of truth and perfection. Consequently, logic, epistemology and ethics are materially contained in ontology although as normative disciplines they may be established as individual structures. Now Husserl's "transcendental phenomenology" is nothing but such a general ontology with an implied radical shift of accent and viewpoint. Transcendental phenomenology asks the question: What structure of the universe corresponds to a consciousness that is confined to pure immanence? The looked-for universe must contain the internal and the external world, nature and mind, values and disvalues, and in the last analysis also the religiously significant universe. Phenomenology, taking its start from the subject, remains ego-centered. At no time does it break radically through the sphere of immanence. Thomism, on the other hand, is God-centered.

Finally, a word must be said regarding methods. At first glance the difference appears to be fundamental. Phenomenology claims an immediate intuition of essences, while Thomism painstakingly adheres to the old-fashioned inductive and syllogistic procedure and has no desire of dispensing with the auxiliary services of empirical and historical research. But it would be a serious mistake to consider the phenomenological "intuition" as a sort of mystical or visionary experience. Husserl and Heidegger can well afford to smile at such misconceptions. The phenomenologist does not sit down at his desk, waiting for the mystical inspiration. The phenomenological method is a process of penetrating analysis. And there are several points in which the two methods seem to harmonise

fairly well. It is a fundamental Thomistic doctrine that all knowledge starts from sense perception. Does Husserl contradict this epistemological principle when he maintains that essences can be intuited without referring to experience? It would be folly to assert that the phenomenologist can altogether do without the foundation of sense experience. We have seen that the phenomenological "reduction" does not negate factuality but merely puts it "out of play," "bracketing" it for reasons of methodology. Thomas Aquinas, on the other hand, does not stipulate an actual external sense perception as an indispensible prerequisite for each and every act of cognition.

Again, according to Thomas Aquinas all human knowledge results from the rational treatment of that material which is furnished by sense perception. The phenomenologist, on the other hand, maintains that philosophical evidence is not achieved by means of induction but by means of intuition. The meaning that is implied here seems to be that the philosopher need not compare a number of material objects and then abstract from them their essential qualities, but that a single exemplary intuition will reveal the essence in the individual object. Phenomenological "abstraction" means "looking away" from all accidental qualities in order to concentrate on the essential nature of the material object. This procedure is approved by Thomas Aquinas who considers the discovery of the "rationes" or essential natures of things as the proper function of the "intellectus dividens et componens." Husserl is opposed to the traditional logical syllogism because he is convinced that his "intuition of essences" penetrates deeper into the world of phenomena. When Thomas, however, assigns to the intellect the function to read and disclose the inner nature of things ("intus legere"), the phenomenologist would admit that this is exactly what he means by "intuition of essences."

Both systems, furthermore, agree in their opposition to the idealistic and rationalistic conception of thought and knowledge

as constructions or creations of human reason. While Thomas Aquinas considers the analytical activity of reason as both active and passive, devoting some attention to the abstractive activity of the "intellectus agens," Husserl stresses the primarily passive character of rational intuitions.

The most controversial issue in phenomenology is Husserl's concept of "immediacy." Immediately evident or self-evident, according to Thomas Aquinas, are first principles. Habitually the human mind is equipped with this kind of immediate knowledge. Objectively speaking, first principles are for us "prima veritas" although from the point of view of priority sense perceptions take precedence. Absolutely speaking, God Himself is "prima veritas." First principles and that light of reason that enables us to argue from the first principles, are the reflection and the image of the absolute "prima veritas" in us. Now there can be no doubt that Husserl claims for his "intuition of essences" the same kind and degree of evidence that Thomas restricts to first principles. Phenomenological intuitions of truth are considered irrevocable and beyond the jurisdiction of experience. They therefore have the character of a priori truths. Only in two other instances has Thomas Aquinas admitted such an immediate and a priori cognition. As the principles of formal logic establish the foundation of theoretical reason so the general recognition of "the Good" (as distinguished from what is good in this or that particular instance) belongs to the natural equipment of the human mind and provides the a priori of practical reason. Finally, we have an immediate experience and evidence of our own existence. This evidence although not prior to any other knowledge is nevertheless a knowledge that does not depend on either deductive or inductive operations.

In order to understand Husserl's insistence on the principle of immediacy of adequate cognition, it is necessary to remember that it was his initial endeavor to break down Kant's conviction

of an inaccessible realm of "things in themselves" and to replace Kant's "ignotum X" by a world of intuitively known essences. From the outset Husserl's interest was no longer centered round the subject but turned decidedly to the object. We have seen before that he did not succeed in breaking through the sphere of immanence and in reconquering a transsubjective reality. Husserl's reality remains a "bracketed" reality whose objects are parts of a transcendental not of a transcendent world. Husserl's "absolute" point of departure is the pure immanence of consciousness. His phenomenology delineates the structure of a universe or of several possible universes that correspond to the functional organisation of human consciousness. The "real" world or "our" world becomes intelligible as one such possibility. Thomas Aquinas, on the other hand, is not interested in possible worlds but attempts an adequate description and explanation of this actual world of ours. He makes use of some of the methods and procedures that might be termed phenomenological but includes the factuality of natural experience as well as the contents of revelation. The focus of Husserl's system is a purified transcendental consciousness. The focus of the Thomistic system is the creative and uncreated Being and His relationship to the various gradations of created being.

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THE NEW PHYSICS—DOES IT VINDICATE FREE WILL?

THE enemies of human liberty are manifold. There are proportionally as many schools of thought which can find no place in their system for moral liberty and responsibility as there are motives for the rejection of such concepts. Yet liberty and freedom of action is one of those convictions to which the human soul bears strongest testimony. This demonstration, drawn indirectly from consciousness, we regard as conclusive. It is the physical determinists and especially the 'New Indeterminists' basing their arguments upon purely physical grounds that are the subjects of our present inquiry.

Today a new epoch in the history of the physical sciences, in its essence distinct and disparate from the older theories, has, under the able leadership of such theoretical physicists as Einstein, Planck, Heisenberg, and Dirac, been revolutionizing the methods and explanations of these same sciences. It is this latter phase of which we speak when we use the term The New Physics, and we refer to the period preceding as that of the Classical Physics. The demarcation is not absolute. There is much in the New Physics that was in the old; there were suggestions in the old that intimated developments in the New. It is of general tendencies and methods that we speak.

This revolution in physics, seeming, as it has, to undermine all the foundation upon which the older physics rested, has terminated in, as at least one of its results, a school of empiricists the like of which has never existed before. It has seemed to these men to have rendered all knowledge empirical and essentially relative. They speak of "the operational character of concepts," by which they mean that we are to admit no concept except that which can be accounted for in terms of empirical operations, whether physical or mental. They speak also of the relative character of knowledge, reviving the corpse of an

epistemological error we thought long ago dead and buried. They refer to any question which is unanswerable in terms of experience as meaningless, as for example:

> Is a universe possible in which two and two is more than four?
> Can we be sure that our logical processes are valid?

Above all, they reject any analytical principle as being possibly contradictory to "new kinds of experience."

> The attitude of the physicist must therefore be one of pure empiricism. He recognizes no a priori principles which determine or limit the possibilities of new experience. Experience is determined only by experience. This practically means that we must give up the demand that all nature be embraced in any formula, either simple or complicated. It may perhaps turn out eventually that as a matter of fact nature can be embraced in a formula. But we must so organize our thinking as not to demand it as a necessity.[1]

Such a doctrine, referred to by Arthur H. Compton as "Kantian phenomenalism," is rather widespread among some of the devotees of modern quantum physics.[2]

To understand one of the conclusions of the New Physics we shall give an example to point. Consider for a moment the green-felted table used for billiards, or better still, for pool. The balls are racked and the first player takes his aim. The shot is a true one, and the cue-ball races from the end of the cue to make a perfect 'break.' Fifteen balls are in motion; fifteen balls are all traveling in diverse directions with diverse velocities. The balls collide among themselves, race to the cushions, some drop into the pockets, others rebound and collide once again with one another. The exact position of each ball is never the same after any two original plays. So unique is the position of each ball and the relative position of every ball that one would be tempted to state that before the play,

[1] Cf. Bridgman: *Logic of Modern Physics* (Macmillan Co., 1927), Chap. I.

[2] Cf. Compton: *Freedom of Man*, p. 40 (Yale U. Press, 1935).

the final position was absolutely unpredictable. On the other hand, if an instant after the 'break' we call for an observation of the whole table, we shall find otherwise. Our observation will reveal two things:

> First, we shall find the exact position of every ball; and Secondly, we shall find the exact velocity and direction in which every ball is traveling.

From this data we can calculate mathematically exactly what position any ball will occupy at any specified instant in the future. The schoolboy's book would put it: If I know that a train is going to Chicago at 100 m. p. h., and is now 100 miles from Chicago, I can calculate that in one-half hour the train will be 50 miles from Chicago; in three-quarters of an hour, 25 miles from Chicago, etc. Such calculation, of course, becomes increasingly complicated the greater the number of moving bodies. It is more difficult to figure the future positions of fifteen colliding balls, but by no means impossible. Now apply this to the physical world. It was the conviction of the old classical physics that if the exact position and velocity of every particle of matter were known, the future position of every particle of matter would be predictable. Of course, it would require a super-mathematician to handle the figures, but the thing in itself would be intrinsically possible. This is what is understood by the strictly mechanistic principle of causation. Everything is predictable, everything is determined by its own antecedent conditions.

To return to our example. Suppose an onlooker touched one of the moving balls after the initial stroke had been given. This would interfere with the whole system. An outside force would have rendered impossible the prediction of future locations and velocities. For, at the very least, the course of one ball would have been changed, and thus alter the relative position of them all. Others which, if there had been no inter-

ference, would have collided with the ball interfered with, either do not collide, or collide more or less vehemently, and the relation of impetus between the two would be changed. Still others would be affected in the converse manner. In short, the whole system would be changed and the results hopelessly unpredictable.

If, then, the principle of predictability,—in other words, the principle of mechanistic causation, *often wrongly spoken of by scientists as the "principle of Causality,"* [3] is to be of any value whatsoever, there must be no outside interference within the system.

Here is just where classical physics and sane philosophy part. Here is to be found the motive upon which the physical determinist bases his rejection of human liberty. The universe is a predictable mechanical system. Given the position and velocity of every electron, the mathematician by mathematics alone, though there be millions of billions of electrons, can predict the future of each one of them, and thus the combined future of the entire universe. Let us turn to a practical application of this doctrine. My right arm is composed of electrons,—electrons the future position of which can be predicted by their own antecedent conditions. Where, then, is my power to raise or lower, at will, this same arm? If science says it will be in one place, how have I power to put it in another? A predictable universe allows of no outside influence on the members of its system. But free will would be such an influence. Therefore there is no free will. Thus reasoned the classical physicist. *Classical physics was deterministic, denied*

[3] Cf. Compton: *ibid.*, pp. 23, 48, where he refers to it as the principle of Causality. It might be of interest to note in passing that this wrong terminology is partially the cause of the widespread scepticism in scientific circles repudiating analytical principles. The scientist's principle of causality is by no means analytic; and consequently, when he hears the philosopher boast of the principle of causality as analytic, he balks, unknowingly deceived by a word he and his predecessors have rendered equivocal.

free will because of the predictability, at least in the ideal order, of all events.

In the eyes of the philosopher such an objection was no objection at all. For it was a blind and dogmatic assumption to state that the universe in its totality is a predictable mechanistic system. When considering the anorganic and the anorganic alone—the proper realm of physics—this was all very well and true. It was not only bad logic, but it was evidently absurd to stretch the conclusion to the field of the living. To include man within such a mechanistic network was arbitrary, wilful, and against reason.

With the new Quantum Theory comes a complete reversal in the field of physics,—a volte-face in the science of nature. Science turns indeterministic and comes to the aid of free will! The law on which all this is based is called the Law of Indeterminism or Heisenberg's Uncertainty Principle. This principle involves a downfall of that 'causal law' mentioned above which deals with the predictability of events, and according to which, if the exact postition, direction, and velocity of all the particles of matter are known, the future regarding these particles can be predicted. This is often called by the physicist "the breakdown of Causality." By this phrasing he does not so much mean to deny causality, as to repudiate the classical idea of deterministic causation. Now, as a matter of fact, the hope of science to determine the exact position, direction, and velocity of even one particle of matter has been blighted forever.[4] Science itself has been the executioner of this cherished desire, and the Uncertainty Principle, its axe.

[4] As will be apparent from the following example and its application, this is most certainly true with regard to the use of light- or X-ray as a means of finding the data. I am assured, however, by those who know, that the scientist is rather loath to give up hope, and that there is now considerable experimentation going on, by which it is hoped that the vacuum tube, one of the instruments of modern physics which is being most rapidly developed, will be able to supply the data. Compton, however, is of the other opinion. He says:

"His (Heisenberg's) case has been made so convincing that I should con-

It is commonly known that in any delicate determination of matter, we must beware that the observation does not affect the matter itself. Delicate scales are enclosed in glass to prevent any slight disturbance of the atmosphere from unbalancing the scale-pans on their razor-edge. Tweezers are used in applying the weights to avoid the transferring of any moisture from hand to scale, and thus destroy the accuracy of the reading. If any mistake were made in the readings because of errors of this nature, the error would be due to *faulty technique* on the part of the experimentalist, and it would not be inconsistent to maintain that such technical errors could be overcome, at least ideally, by *increased efficiency.*

On the other hand, it is not inconceivable that another sort of error enter into the calculations—an error that would be different in species from a technical error,—an error, namely, that would be *necessary,* not because of defective instruments, but because of the physical laws themselves. *Such an error takes place when science tries to determine the exact position and velocity of the smaller particles of matter.*

Consider for a moment a blind man standing over a billiard table. He is absolutely deprived of all sight, even the vaguest, but, as is the case with many such, his hearing is more sharp and more sensitive than the ordinary man's. In his hand he holds the cue-ball, and there is a single numbered ball resting on the felt. In order to find where that ball is, the blind man must roll his cue-ball up and down and across the table. He is trying to make the cue-ball and the numbered ball collide; by the sound he will know the location of the numbered

sider it more likely that the principle of the conservation of energy or the second law of thermodynamics would be found faulty than that we should return to a system of strict causality. Cf. *ibid.*, p. 23.

And again:

". . . I mean that if the duality of wave and particle characteristics apply to all forms of matter, as both theory and experiment seem to indicate, Heisenberg uncertainty is inescapable in any observation which uses a material detecting instrument." Cf. *ibid.*, p. 47.

ball. He has made the attempt several times with no success, but now at length they collide. Then satisfaction! But immediately his knowledge is followed by a keener disappointment! He hears the sharp impact and knows now where the ball was. But the very collision *that was necessary for his knowledge has driven the ball, spinning, to another position on the table.* He can try again. This time he rolls the cue-ball very lightly, and in striking the other ball, it does not impart so much motion, but the corresponding sound is not clear, but vague, and consequently, the position of the ball is known less accurately. *The blind man can never obtain an exact knowledge of the position of the ball, because the condition necessary for the obtaining of that knowledge, necessarily involves a change in the position of the ball.* He knows where the ball was, but in learning the fact, he has sent the ball he knows not whither.

When the physicist is striving to discover the location and velocity of an electron, a like phenomenon occurs. He must use some kind of light—or x-ray as a means. Now light—and x-rays are forms of energy, and their energy is radiated in "quanta" which are the minima of energy. Thus, to perceive the whereabouts of the electron, at least one "quantum" of light—or x-ray must be used. But what is the result of their use? The electron absorbs some of this energy, converting it to the form of kinetic energy of local motion, and its speed is accelerated in some unknown degree in some unknown direction! As in the case of the blind man's numbered ball, *the observation interferes with the observed.* In other words, *in determining the position of the electron, that same position is necessarily, and by reason of the observation made, changed in some unknown degree.* We learn where the electron was, and, once again, in the learning, send it we know not whither. Prof. A. S. Eddington puts it: "An addition to knowledge is won at the expense of an addition to ignorance." [5]

[5] Cf. Eddington: *Nature of the Physical World* (Macmillan Co., 1930), p. 229.

Now the light waves of a long length contain much less energy than x-rays which are of a very short length. Thus we can still keep up our analogy of the blind man and his billiard balls. The x-ray (containing more energy) corresponds to the cue-ball when going with a considerable force; the light-ray, to the same when traveling very slowly. Both the x-ray and the cue-ball in the former case greatly change the position of the object to be observed, but record the position in which the object originally was with great accuracy. Both the light-ray and the cue-ball in the latter case, i. e. when traveling very slowly, affect the object in a much smaller degree, but they record the original position in a proportionally vaguer manner. Eddington explains the phenomenon in very clear language:

> If I use longer waves which do no harm, they will not define the electron sharply enough for you to see where it is. In shortening the wave-length, just as the light becomes fine enough, its quantum becomes too rough and knocks the electron out of the atom.[6]

From all this it follows that, *with regard to our cognition of them,* there is in the particles of matter an indetermined element. They are left dangling, and the exact amount of their dangling is unknown.

At this phase of our discussion we must not forget the Parmenidean theory of cognition and reality. What is, is known, and what is known, is. Now this is merely a mode of expression of that empiricism which rather universally has been the method of science in general, and which has been so unconditionally affirmed by some as a result of the findings of the New Physics. The conclusion is evident. The determination of exact position and velocity of the ultimate particles of matter is not known, nor can it be known. Therefore neither does it exist. *These particles are objectively indetermined.* The man of science, then, very rightly realizes that the only reason he had for

[6] Cf. Eddington: *ibid.*, p. 224.

denying free will, namely, the rigidly deterministic hypothesis of the predictability of all events, is no longer valid. Since he is bent on including, in one and the same order, all reality, and since electrons are indetermined, why can't the human will also be indetermined? Why can't the human will be free? Why can't the human will have influence to bear on matter?

The New Physics is indeterministic, admits free will, because of what is called "the breakdown of causality," i. e. the unpredictability, the indetermined character of all events, stated in the Principle of Indeterminacy.

The physicist does not so much plead the cause of free will as suggest the possibility of philosophical consequences. Hence our title: Does Physics vindicate free will? In other words, does it furnish the premises upon which free will can be based? Some of their number bring up this question explicitly, as, for instance, Karl F. Herzfeld in *Thought:*

> It is in connection with this impossibility of determining accurately the future behavior of physical systems that some scientists have brought up the question of free will, asserting the lack of determinism recognized as a consequence of the new quantum theory made free will possible.[7]

G. E. M. Jauncey in his Modern Physics has a paragraph entitled "Freedom of the Will."[8] The Staff of the University of Pittsburgh in their Atomic Physics, say that "in this manner the Uncertainty principle throws fresh light on the philosophic problems connected with causality and determinism."[9]

It is only just to remark that not all the physicists forsake reason so far as to argue thus from non-percipi to non-esse. Many of the greatest, such as Einstein, Planck, and Schro-

[7] Cf. Thought: *The Quantum Theory of Matter:* March, 1936.
[8] Cf. *Modern Physics*, p. 538 (Van Nostrand Co., 1932).
[9] Cf. *Atomic Physics* (John Wiley Co., 1933), p. 321.

dinger, point out the difficulty where it really is, namely, in our cognition. Many such fausse-pas in fundamental philosophy are perpetrated by such popularizers as Arthur Eddington, while the real scientists reserve their judgments or repudiate such findings. However, it is a matter of comparatively small importance which scientist has also entered the field of metaphysics. We accept the physical facts from them admiringly. We criticize the philosophical theories in the light of true principles.

Let us examine the application of the principle of Indeterminacy to the objective world, instead of retaining it merely as a principle of cognition. As far as we know, its clearest expositor is A. S. Eddington. When speaking of the difficulty, he says:

> From this point of view we assert that the description of the position and the velocity of an electron beyond a limited number of decimals *is an attempt to describe something that does not exist,* although curiously enough the description of position or velocity if it had stood alone might have been allowable.[10]
>
> This is not a casual difficulty; it is a cunningly arranged plot—a plot to prevent you from seeing *something that does not exist,* viz. the locality of the electron within the atom.[11]
>
> The suggestion is that an association of exact position with exact momentum can never be discovered by us *because there is no such thing in nature.*[12]

To explain free will by the principle of Indeterminacy three things are necessary:

1. The conclusion, objective indeterminacy, must be correctly inferred from the premise, inadequate knowledge.
2. Prescinding from the legitimacy of the inference, such a principle must involve no contradictions.

[10] Cf. *Op. cit.*, p. 222 (italics mine).
[11] Cf. *ibid.*, p. 224 (italics mine).
[12] Cf. *ibid.*, p. 225 (italics his).

3. Such objective indeterminacy must render an explanation of free will.

All of these points are essential to the argument of our adversaries: none of them is valid.

In order to examine them, however, we must orientate ourselves, with the physicist, according to his own point of departure. Science cannot have anything to do with the unknowable. Since, then, science has shown the exact position and velocity to be unknowable, it would seem that objectively there is no exact position and velocity. But let us give pause. Science, we said, has shown that the exact position and velocity of the electron are unknowable. Now science can legitimately bear testimony to occurrences in the physical world, but this testimony must be confined to the means which it has at its disposal for investigating the physical world. Science, then, confesses that it cannot know certain phenomena, because the only means that it has for knowing the phenomena interfere with the phenomena themselves. It has no right, therefore, to draw the conclusion that such phenomena are unknowable, but simply that it, by the only means it has, cannot know these phenomena. Nor does the fact that these means are not in themselves defective alter the case. Although the means are not defective, neither are they sufficient. It is beyond the province of science to decide whether, by some means other than its own, such phenomena can be known. God, for instance, whose existence is invincibly proved from premises furnished by science itself, can, and de facto does, know the exact position and velocity of these particles.

It must be insisted upon, nevertheless, that we do not here appeal to the supernatural as the "deus ex machina" or solution of our problem. We can ask the question,—just how much does science know experimentally with regard to the position and velocity of the electron? It has certain knowledge that the motion and position of the particles are determined in general,

i. e. the electron is going not less than X m. p. h. and not more than Y. The position of the ultimate is between point A and point B. Because there is a cognoscitive indetermination amounting to XY in the velocity, or amounting to AB in the position, it does not follow that there is a corresponding objective indetermination. For there are two ways in which a thing may be known. The first is to know that it is a thing, i. e. to know that it exists; the second is to know what thing exists, i. e. to know what exists. Now, although it is impossible for science to know the latter, to know exactly what exists, to know exactly what the position and velocity is, it is not only not impossible, but it is a fact that science does know that it exists, that there is an exact position and velocity. It is only in passing that we have shown that this position and velocity can be known by other means with regard to its essence, and not only as science knows it, with regard to its existence. Prof. Eddington says:

> The world of physics is a world contemplated from within, surveyed by appliances which are part of it and subject to its laws. What the world might be deemed like if probed in some supernatural manner by appliances not furnished by itself, we do not profess to know.[13]

Yet he does profess to know, for to deny the existence of something is to profess to know that that something does not exist.

That science does know the fact of the determination is easily demonstrated, for any other contention is self-contradictory. Science knows many things which it does not know directly, for it is not merely classificative nor symbolic (although in other places in his book Eddington insists on the latter), but rational and objective.

We have noted above that positivistic tendency which considers the sum of our knowledge as the sum of reality. But cognition is a one-way road. I may know a thing or I may not know it, but the thing remains what it is despite the vicissitudes of my knowledge. Reality is not a function of cognition,

[13] Cf. *ibid.*, p. 225.

nor cognition a ratio involving a variable reality. I cannot conclude from a negative premise to a positive conclusion. Because I find a deficit in the logical order, I cannot conclude to a like lack in the ontological. A non-percipi ad non-esse non valet illatio.

So far we have seen that objective indeterminacy is not a legitimate conclusion from the measurements in the sub-atomic world. Merely a cognoscitive indetermination, of course, would not be sufficient to explain free will. This first step which is essential to the "New Indeterminists," is founded on a false inference, and hence is valueless.

There is a notion upon which we must here insist, for it is one which has either escaped, or has not at all been stressed by the majority of the writers to whom we have had access. Indeed, none of them seem to realize the import of this necessary implication. It is this: the uncertainty of the Indeterminacy Principle is an affair of the present,—not of the future. In stating it, Eddington does not say that what the exact position and velocity will be is indetermined, but what the exact position and velocity is. Of course, since the present is needed to predict the future, the future also is indetermined. But it is primarily with the present that the principle concerns itself. Its effects alone pertain to the future.

In the example of the blind man's billiard ball, it is because he does not know where the ball is, that he cannot predict where the ball will be.

Now it is nothing more or less than a contradiction to say that something can be ontologically indetermined with regard to its present status. An indetermined thing is a universal thing, i. e. a thing that may be determined to more than one individual. But no universal thing can exist in the ontological order, for it would be both one, in as much as it existed, and many, in as much as it is indetermined. I say it would be one in as much as it existed, for in as much as it exists, it is a

being, and there is a foundamental thesis of Ontology to the effect that every being is one. We have already explained what we mean by its universality. For an indetermination which is indeterminable, and yet remains in the order of existence, is meaningless.

On the other hand, possibly someone would assert that the motion of the electron is not one, but several in series. If I travel from New York to Chicago with a uniform motion of 50 m. p. h., the motion is certainly one. But a change of the end, and, in a certain sense, at least, of the velocity, specifies the motion. If I am driving in a city and turn one corner and then another, and then a third and a fourth, my motion has changed four times. Likewise, if I drive now at 30 m. p. h., now at 40, now at 20, now at 10, etc., my motion certainly changes. In the former case, while I am driving North, I am actually in motion and I am actually driving at that individual motion in particular, but I am not yet moving with regard to the Westward motion. And, similarly, when I am traveling at 30 m. p. h., I am actually in motion and I am actually moving at that individual motion, but I am not yet moving with regard to the 40 m. p. h. motion.

Now, as we have seen before, when the electron is observed, it receives energy and gathers increased acceleration. The electron, before the observation, is not yet moving with regard to the new accelerated motion brought about by the observation. The old motion, since it is present, is determined. The new motion, once it exists, is also determined. But the electron, during the old motion and before the new motion, is not determined with regard to the new motion. It is, therefore, indetermined, not in the sense put for by the Principle of Indeterminacy, with regard to its present state, but with regard to its future state. *A thing, with regard to its present state, is always, in scholastic terminology, in actu secundo and thus always determined.*

Thus, not only is the inference, by which objective indeterminacy is concluded of the electron, false, but that objective indeterminacy itself is repugnant. It is evidently absurd to place the foundation of human liberty on a contradictory principle. Now, certainty is essentially a subjective state. It is an assent of the mind. It is for this reason that we prefer the title "Uncertainty Principle" to "Principle of Indeterminacy." For we have shown that this principle deals solely with states of the mind,—with cognition.

If we were to suppose consistency in the place of inconsistency,—if we were to suppose objective indeterminacy possible, we must face the further question: can it save free will? Does the Law of Indeterminism, as interpreted by Eddington, "reconcile" the philosophic conviction of free will and the so-called "facts?" Does it do away with what we might call a 'psychological antinomy?'

By free will we understand a faculty that is indetermined. But note that the very purpose of that indetermination is to determine. In other words, the purpose of free will is to furnish a determination for the indetermined,—to make of an indetermined future a determined present. My free will is now indetermined as to whether I shall read Rosmini or Sabatini; I read Rosmini, but that which was an indetermined future is now a determined present, and, as long as I read Rosmini, I am not free or indetermined to read Sabatini. On the other hand, if, in the supposition of our adversaries, the present is indetermined, the whole raison d'être of free will is withdrawn. Free will can give us no solution of the difficulty, for not even free will is indetermined in actu secundo. For free will essentially looks to the future, and the only conceivable objective indetermination is indetermination in actu primo.

In spite of the fact that the Uncertainty Principle and its application to the objective world involves yet more laughable absurdities, it is seriously put forth by not a few. If we were

even to go farther and grant that it were not contradictory for a thing to have free will with regard to its present action, the very supposition would involve one of three possibilities:

1. either all electrons (or ultimates) would have free will;
2. or none would have free will;
3. or some would have free will and others not.

If, as in the first case, all electrons or ultimates had free will, this fact would render no explanation of human liberty. For the electrons would determine themselves and leave no room for the influence of the human will in the physical scheme. Add to this the fact that the world would be chaos, since the electron, having no cognition, would be possessed of that absolute indeterminism of Schelling and Fichte, and be susceptible to neither motives nor coordination. In the second case, if the electrons had no free will, it would perhaps explain the influence of man, but would not explain what influenced those electrons which did not come into contact with man. With regard to the third possibility, namely, that some of the particles would have free will and others not, the only criterion of such freedom able to be found, would be an absurdly subjective and arbitrary one, consisting in the desire that some particular man might have of influencing it. Moreover, for the same reason, one and the same particle now would have liberty, and now would not, a position which would logically involve a relative theory of truth.

There is but one possibility remaining yet to be considered. We have seen that the particle, before the observation, was in actu primo with regard to its new motion taken on after the observation. Would this leave an opening for free will? When one billiard ball strikes and changes the course of another, the impetus is communicated from one to another. When the quantum of light strikes and accelerates the speed of the electron, its energy is absorbed by the electron. In either case the transfer is evidently entirely deterministic and mechanistic.

Free will would not be vindicated for us, even were we to admit the entire argument based on the Uncertainty Principle. The physicist would merely withdraw his arguments. He leaves the question open as to whether this influence of mind on matter is to be explained by free will or psychological determination. In other words, he merely admits some other than strict mechanistic, physical causality, that the final cause is a real cause; he does not even consider, much less solve, the more fundamental question of Leibnitz and Jonathan Edwards, whether or not the final cause compels the agent. Either solution would, as far as these physicists go, explain the hypothesis as well.

To sum up, then, the fact that I cannot know the exact position and velocity of the small body, does not mean that it has no determined position and velocity, for the relation of cognition is a unique relation in which the thing is independent of whether it is known or not. Add to this the fact that since every existing thing is individual, for a thing which occupies place, to occupy no definite place, or for a thing which moves to move at no definite speed, is contradictory, and it becomes evident that Heisenberg's Uncertainty Principle must not be stated, as Eddington insists:

> ***a particle may have position or it may have velocity, but it cannot in any exact sense have both.***[14]

Rather must the principle take some such form as this:

> We may know the position of a particle, or we may know the velocity of the particle, but we cannot in any exact sense know both.

Furthermore, such an objective indeterminacy, even if admitted, would in no way explain free will, and even if it would "explain" it, it would be no demonstration of the fact, but merely the withdrawal of an objection which was by no means

[14] Cf. *ibid.*, p. 220 (italics his).

the most difficult of solution. Thus, in each of the several essential points mentioned, has the Uncertainty Principle failed in the objective put forth for it by some: the rehabilitation of free will.

In attempting to follow and to point out a few of the consequences of admitting that Heisenberg's Uncertainty Principle is a principle of reality and not merely a rule of our own cognition of reality, we have run into quite a few evidently absurd propositions. When such absurdities follow logically from a premise, it is a most certain sign that the premise is radically at fault.

Modern extra-scholastic psychology is going through a condition of unrest and change. It has finally become conscious of the utter insufficiency of any kind of materialism. It is grasping for a straw; it seems ready and willing to consider any possible solution to its problems. The uncertainty principle has been brought to its notice, and in certain quarters [15] psychology has been noted to reach out, just as the drowning man for his straw. But the straw will not hold the man. Let psychology hope nothing from the Uncertainty Principle. It is a principle of cognition, not of things. It is a principle of uncertainty, but it is certain to fail in any attempted explanations of life or vital phenomena.

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[15] Cf. Wm. McDougall: *Modern Materialism and Emergent Evolution* (Van Nostrand Co., 1929), p. 242. Cf. Whole book of Arthur Compton: *The Freedom of Man.*

OBJECTIVES IN TEACHING PHILOSOPHY

IT is probable that many a professor of philosophy, as he lays aside the last examination paper of the proximate graduate from his department, has misgivings as to the quality of the results obtained. They are rarely what they might have been, rarely satisfactorily attained objectives. He may find that some of his pupils have become good students of philosophy, fairly well acquainted with the field and deeply interested in the subject; but he will also find that very few have become philosophers, acquired the habit of philosophizing.[1] With a zeal then, not too common in the teaching profession, he may examine his pedagogical conscience in order to discover, if possible, where the reasons lie for this relative failure.

He may try to place the blame on his students: they were intellectually immature, undisciplined in their mental habits, distracted by too many external and superficial things, prejudiced against philosophy as something impractical, infected by the current skepticism, and so on. To a degree of course, his censures will be supported by a decent amount of evidence. But after all that, he will have himself to consider—his knowledge of the subject, his skill and enthusiasm in imparting it, his understanding of and sympathy for his students and, most especially, the objective which he was assisting them to attain. He will realize that this last is of supreme importance, for unless it has been clearly in his mind he will have no adequate criterion with which at the end to measure their success or failure. If he has not been clear on this, it is safe to say that he need not seek further for the principal cause of the failure of his students, and of his own. Random activity, however intense, can result only in confusion of mind. What then is the objective, or possibly, what are the objectives, of the teaching of philosophy on the college level?

[1] Cf. Brennan, *General Psychology*, p. 3.

Is it to make philosophers? If so, what are their distinctive attributes? Is it to form students of philosophy? or merely to provide a bit of cultural background for more particular fields of investigation? If it is any one of these as against the other two, how is such exclusion justified? Again, is it possible to pursue any one of these objectives without at the same time achieving in some measure the good of the other two? Can one, that is to say, be a philosopher without being a student of philosophy, or a student of philosophy without being a philosopher, or make application of philosophy to particular problems without being either a student of philosophy or a philosopher? Are these various objectives subordinated to one another, or are they simply co-ordinates?

It is not easy to answer any of these questions and, so far as I know, there is precious little written that bears directly on the subject. Teachers of philosophy, like teachers of other subjects, must of course do their share in communicating to their students the accumulated wisdom of the past. For the content of the philosophical curriculum cannot be ignored, even if opinions may differ as to what portions of it shall be selected for presentation. But that much being granted, does it follow that in the systematic and methodical presentation of this subject, we can not merely interest young men in the subject of philosophy, so that they will read into it deeply with both pleasure and profit and be able to see its main applications to the problems which arise in the other branches of learning, but also train them in what may be described as the *habitus philosophandi?* In other words, is this habit, or group of habits, or virtues, a by-product of three years of application to philosophical literature in the form of lectures, directed reading, controlled discussion, written criticisms of special points, etc., or is it to be considered as the supreme objective itself with a method of teaching so adapted as to produce precisely this result?

Whatever the true answer may be, it is probable that the older Scholastics (and those who have clung tenaciously to tradition) favored the latter, and that most present-day teachers of philosophy favor the former view. For the device *par excellence* of the former group was the *disputationes quodlibetales,* or formal disputation.

Many readers will recall that in some of the Roman schools something like one-fifth of the time devoted to any course, i.e., one day out of five in the week, plus another out of each month, was employed in the formal discussion of the materials previously studied. Most certainly the aim in these discussions was not primarily information, not to extend the range of philosophical knowledge, not to make students of philosophy. It was rather to give the student "training in exact reasoning," to accustom his "mind to careful reflection" and to develop "the critical faculty"; it was to give him "the habit of disentangling and clearing up his ideas, of arranging them in order, of introducing rigorous sequence among them"; of inculcating "a spirit of disinterested inquiry after truth." It was finally to nourish "in the soul what we may call the craving for the universal, the desire to grasp the idea in the fact, the abiding law in the contingent phenomenon."[2] Or, as it seems to me, to make a man a philosopher. At any rate, it would seem presumptuous for any man to claim to be a philosopher who does not possess these qualities and habits of mind.

Moreover, that it was by the possession of these perfections he was judged worthy of promotion is clear from the manner in which his final examinations were conducted. For the very form of the examination was a species of *disputatio.* No mere show of erudition, or of having read widely in the field, not even the ability to set forth in accurate and intelligible discourse the positive side of a given thesis, would win for him

[2] P. Coffey, *The Science of Logic,* v. 2, pp. 19 and 20.

the coveted *probatus*. The real rubicon that he had to cross was the successful defense of certain definite propositions—the examination itself was often called a defense—for, apparently, it was here that the final test of the philosopher, as against the mere student of philosophy, came. In trying to determine whether he had attained the proper objective of his philosophical studies, the examiners did not look for an encyclopedic knowledge of the subject, which is possible only for the rare genius, nor for a keen interest in and an intelligent grasp of the principal problems involved, which is possible for even the ordinary mind, but for the presence of a very definite set of intellectual habits by reason of which he would be able to defend his position against all rival views on the subject. It is such men who were pronounced masters or doctors of philosophy, and since it is to them that is intrusted the office of teaching philosophy, it is presumable that they were considered to be philosophers, and that aiming to make these should be the supreme concern of the teacher of philosophy.

Now though the *disputatio* and the presentation of subject-matter in rigorous syllogistic form, which is its indispensable ally, are retained in some of our seminaries, a different method has for the greater part come into vogue in our colleges. On the whole, it seems to be assumed that the intellectual virtues which distinguish a philosopher from a mere student of philosophy are a by-product of the study of philosophy, rather than things to be directly aimed at as an objective. "Some things," it is said, "must be learned, but cannot be directly taught." Patriotism, for example, and style in writing, and musical appreciation, the moral virtues.[3] Is this true also of the intellectual virtues of intelligence, knowledge, wisdom?

Aristotle wrote that "intellectual virtue in the main owes both its birth and its growth to teaching (for which reason it

[3] Cf. Hutchins, *The Higher Learning*, p. 63; *No Friendly Voice*, pp. 4, 66, 93.

requires experience and time), while moral virtue comes about as a result of habit. . . ." [4] On this point St. Thomas comments as follows:

Dicit ergo *primo* quod, cum duplex sit virtus, scilicet intellectualis et moralis, intellectualis virtus secundum plurimum et generatur et augetur ex doctrina. *Cuius ratio* est, quia virtus intellectualis ordinatur ad cognitionem. Quae quidem acquiritur nobis magis ex doctrina quam ex inventione. Plures enim sunt, qui possunt cognoscere veritatem ex aliis addiscendo quam per se inveniendo. Plura etiam unusquisque inveniens ab alio discet quam per seipsum inveniat. Sed quia in addiscendo non proceditur in infinitum, oportet quod multa cognoscant inveniendo. Et quia omnis cognitio nostra ortum habet a sensu, et multoties sentire aliquid facit experimentum, ideo consequens est quod intellectualis virtus indigeat experimento longi temporis.[5]

Whatever else may be said of this text and commentary, it seems to be the mind of both Aristotle and St. Thomas that the intellectual virtues (which above all characterize the philosopher) are not to be directly aimed at, but are to be sought as a by-product of the methodical assimilation by the student of a body of philosophical knowledge through teaching. Our question would then seem to be this: Is the by-product more important than the product? Or, is discipline more important than information, skill more important than content? "If we aim at discipline alone to the utter neglect of information, we are apt to create a bigot, not a scholar. And if we aim at information alone to the disregard of discipline, we shall foster vanity. The result will be *vox et praeterea nihil.*" [6] Neither of these results of course is desirable. Dialectical skill without informational treasures is like a clever act without a play, and informational treasures without power of analysis and expression is like lumber gathering dust in the attic. But if the two ends, information and discipline, are not to be sought in-

[4] Ross, *Aristotle, Selections*, pp. 229, 230.
[5] *Ethicorum*, No. 246.
[6] Tierney, *Proceedings*, The Catholic Educational Association, v. 10, p. 197.

dependently one of the other, it may be argued that whereas philosophical information is a direct product of the study of philosophy, discipline of mind is the purpose of a liberal education as a whole, and so only incidentally an aim of the course in philosophy. "In my judgment," says Father Stocker, "information must be the primary aim in teaching philosophy; for a distinct and specific subject matter to be brought to the apprehension of the scholar is the *raison d'être* of philosophy as a distinct science and distinct branch of study. . . . To purchase the philosophical habit, . . . 'to open the mind, to correct it, to refine it, to enable it to know and to digest, master, rule and use its knowledge, to give it power over its own faculties, application, flexibility, method, critical exactness, sagacity, resource, address, eloquent expression,'—this does not belong to philosophy alone, but is the product of liberal education as a whole, a fruit toward whose maturing all the studies of the college course contribute their share." [7]

This is obviously not to place mental discipline on a lower level than information; it merely contends that it is no more the business of the teacher of philosophy to seek to develop it than it is the business of any other teacher in the liberal arts college. Surely, among the things which the teacher of philosophy may presuppose as possessed by students when they come to him is a mental development suitable to the work they are about to undertake. If they do not possess such development—and too often this is the case—I do not believe the teacher of philosophy can be justly blamed if the result of his labors is merely students of philosophy and not philosophers. To acquaint a student with the content of a given philosophical subject is difficult enough. To expect the teacher to begin at the same time the training of the student in orderly thinking, in the power to criticise, in the habit of thinking for himself and in confidence in expressing what he knows, is too much. "The

[7] *Ibid.*, p. 193.

problem is not," as Dr. Pace has so well put it, "how philosophy shall be introduced to the mind, but how the mind shall be led in to philosophy and prepared to philosophize." [8] Oddly enough, the successful attainment of the objectives in the teaching of philosophy lies not so much with the actual teacher of philosophy when it is taught, as with earlier teachers who "cultivate in the pupil a mental habit, a way of thinking which, when it comes to maturity, will be the way of philosophy. . . ." [9] Given this preparation, the teacher, while stressing information about philosophy, will be able to carry to higher perfection the habit of philosophizing; he will be able to make philosophers of his students of philosophy.

Complaints about the isolation of subjects in the curriculum, about departments and departmentalization, about lack of correlation and integration, lack of order and sequence and relatedness have, within recent years, become extremely trite. But, for all that, the departments have remained. The specialists too, even on the undergraduate level, have remained. And the division of the field of learning into various disciplines has remained. And I for one can see no good reason why they should not continue to remain. The harm does not arise from the division of subjects, but from forgetting and then ignoring the fact that though divided from one another they are still intimately related to one another. There is much tiresome talk among anti-intellectualist educators about discovering a principle of integration in education, and among them one thing after another has been tried and found wanting. But no one who accepts the Thomistic philosophy as the basis of his educational theory, who with it accepts being as the measure of truth, and experience as the source of knowledge, has any doubts about what such a principle is. The order of knowledge is a correlate of the order of being, and as things are unified or

[8] *Proceedings*, American Catholic Philosophical Association, v. 3, p. 22.
[9] *Ibid.*

integrated in reality, so they are unified and integrated in the mind. "Nature is embodied ideas." All things are inter-related, for existence can be predicated of them analogously. So also all cognitions are inter-related, for they are but the mental apprehension of things. Chief among the relations that bind things together is the casual relation. And it is precisely the casual relation that lies at the heart of philosophy. It is the development of the mental habit of seeing these relations in whatever is studied in early schooling that constitutes the remote preparation for the fruitful study of philosophy. Let then teachers of mathematics and of science, of literature and of languages keep this in mind, let them put it into practice in their teaching, and their students later on will not merely be able to read and memorize parts of their philosophy texts, but they will be equipped with the habit of philosophical thinking, and so prepared to become philosophers.

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MATHEMATICS AND METAPHYSICS IN SCIENCE

THERE was a time when metaphysics served as the old ancestral home where the particular sciences dwelt and worked; but as in the industrial sphere, so also in the educational, both work and workers have left the home and followed the lines of piece-work and specialization. Perhaps it were better to say that metaphysics was the old mother who watched over the work of her progeny and saw to it that all co-operated in peace, harmony and helpfulness. But that was a long time ago. Since then the sciences have gone afield, each pursuing its own line of endeavor without thought of the others or of the old mother left alone to commune with herself. Today, however, the sciences are beginning to feel the need of metaphysics, and to answer their call she must follow them into their various fields. It is true that physics, in particular, allied itself to mathematics in the hope of getting along without metaphysics, but even the resulting lordly mathematical physics is now clamoring for a "philosophy," for a system of metaphysics.

In a significant article by Einstein [1] this need is expressed. Nor is the emphasis on the need diminished by the fact that the learned author believes that the mathematical physicist must handle the situation himself.

> It has often been said, and certainly not without justification, that the man of science is a poor philosopher. Why then should it not be the right thing for the physicist to let the philosopher do the philosophizing? Such might indeed be the right thing at a time when the physicist believes he has at his disposal a rigid system of fundamental concepts and fundamental laws which are so well established that waves of doubt can not reach them; but, it can not be right at a time when the very foundations of physics itself have become problematic as they are now. At a time like the present, when experience forces us to seek a newer

[1] Albert Einstein, "Physik und Realität," "Physics and Reality" (transl. by Jean Piccard), *Journal of the Franklin Institute*, March, 1936.

and more solid foundation, the physicist cannot simply surrender to the philosopher the critical contemplation of the theoretical foundations; for, he himself knows best, and feels more surely where the shoe pinches. (p. 349)

Surely no one can object to the scientist's philosophizing; in fact, only by having recourse to philosophy, and a common philosophy, will science be able to make further progress. Unfortunately, Einstein's efforts at philosophizing are not entirely satisfying. True, he is on solid enough ground when he says that "the whole of science is nothing more than a refinement of everyday thinking," that the concept of the "real external world" rests on sense impressions, and that generalized knowledge is "stronger and more unalterable than the individual sense experience itself." But he disappoints us when he continues:

The very fact that the totality of our sense experiences is such that by means of thinking . . . it can be put in order, this fact is one which leaves us in awe, but which we shall never understand. (p. 351)

In other words, Einstein is at a loss to say by what process we derive our general concepts from sense data. Likewise he is amazed that we can re-connect our general concepts with sense experience and find that they *work*. That fact, he says, "is a miracle."

That his amazement is due to the influence of Kantian philosophy can hardly be doubted. Then, for fifteen pages, there is no overt allusion to philosophy until we reach the Theory of Relativity. He takes the position that this theory is philosophical, but he does so on the ground that anything deductive is philosophical, leaving to science nothing but induction. And induction is based on the incomprehensible and miraculous concepts mentioned above.

There is no inductive method which could lead to the fundamental concepts of physics. Failure to understand this fact constitutes the basic

philosophical error of so many investigators of the nineteenth century . . . Logical thinking is necessarily deductive; it is based on hypothetical concepts and axioms (p. 366).

Science, as distinct from philosophy, does indeed use the inductive method wherever possible, but is it a travesty to say that philosophy is restricted to deduction from "freely chosen axioms" (p. 353). Or from the fewest possible axioms and shrewd guesses? Yet Einstein describes the present philosophizing effort of scientists as aiming at "a system of the greatest conceivable unity of the greatest poverty of concepts of the logical foundations, which are still compatible with the observations made by our senses" (p. 353).

This process leads to higher and higher "layers" or "degrees of abstractions," yet does so without our understanding how any of these higher concepts are derived, or extracted from sense data. "I do not think it justifiable," says Einstein, "to veil the logical independence of the concept from sense experiences. The relation is not that of soup to beef but rather of wardrobe number to overcoat" (p. 353). It will not escape the reader that Einstein prefers his index-number method of abstraction to the supposed beef-extract method of unscientific philosophers. And we are told in the Summary that the connection of sense with theorems "can only be comprehended intuitively" (p. 381). Nor is there any doubt that the intuition is expected to be mathematical, nor that Einstein's own "field theory," Relativity, is intended to serve as a guide to any future philosophizing about science. All in all this is a brave effort, but it leaves much to be desired.

Philosophy, after all, is a rather broad term to use in this connection, since there are parts of philosophy, such as ethics and aesthetics, which have little or no points of contact with the physical sciences. A better term is metaphysics, but even here the difficulty is that science is not adequately distinct from metaphysics, and to dissociate the two requires our taking sci-

ence in a very restricted sense. If this should wound the sensibilities of any scientific reader, my apology is that this is a surgical operation performed for the purposes of demonstration, and I trust the system can be put together again. Science, in so far as it is not metaphysical, is purely positivistic. In this sense one could follow Compte, and be a good scientist (though not a philosopher). Science, thus restricted, does two things: (1) it discovers the parts (the extended or spatial parts) of natural bodies, in larger and smaller sizes ranging from island universes and solar systems down to the tiniest minutiae of nature. Just as in studying an organism the biologist discovers the several organs, tissues, cells, cytoplasm, nucleus, chromosomes and genes, so the physical scientist brings to light the evidence for ultimate crystals, molecules, atoms, alpha-particles, protons, neutrons, electrons, positrons and neutrinos. Having done that, science asks (2) how these various parts *act*, and how various groups act, under given conditions. When science, without metaphysics, has done that it is through.

Further than that the scientist cannot go without metaphysics. Because one atom of oxygen which he examined contained sixteen protons and sixteen electrons, how does he know that all atoms of oxygen contain the same? Or that the examined ones continue to contain the same a moment after the experiment? If he turns his attention to the activities of the oxygen atom and discovers that it combines with two atoms of hydrogen, how does he know that it will do the same next time? Or if an object placed on the scales shows a certain weight, how does he know that it has the same weight, or any weight, when not on the scales? If he wished to renounce metaphysics altogether he could not even suppose that any object continued to exist when it was not under observation. Scientists of course (except perhaps Bridgman[2] and his kind) do not take any

[2] Cf. P. W. Bridgman, *The Nature of Physical Theory* (Princeton University Press, 1936).

such purely positivistic stand. They take it for granted that there is a permanent subject underlying the phenomena they observe and profess to know something about the nature of that subject. Their statements go far beyond their observations. They appeal beyond physics to metaphysics.

There is, it is true, what might be called a battle, or a boundary dispute, between the scientists and the metaphysicians, as is exemplified in such works as Bavink's *The Natural Sciences* and Maritain's *Les Degres du Savoir.* The former writer, having no clear principle of division, is rather battling himself than the "posivists"; the latter, seeking the remote heights of ontology, favors a sort of neutral zone between science and metaphysics. But if we understand Aristotle's first degree of abstraction as that which prescinds from the individual but keeps the qualities, the second as keeping only the quantity, and the third as penetrating to substance, grasping the generic and specific natures thereof, then the last step is characteristic of metaphysics; but it does not follow that metaphysics *excludes* the first two steps. I say "substance" instead of "being," because substance is pre-eminently being, and because the really existing and specific substantial natures furnish the key for the solution of the problem which the first two degrees of abstraction leave unsolved. Hence both the physical sciences and mathematics are incomplete sciences; and metaphysics completes them, not by adding something entirely separate, but rather by permeating them as their soul and giving them their final form.

In spite of this it is not the fashion for scientists to plead guilty to the use of metaphysics, rather they disclaim such use. Mathematics, in many fields of science, is appealed to, instead of metaphysics, as warranting the generalizations and conclusions which simple observation or isolated experiments can never guarantee. Haldane, to cite an extreme case, uses mathematics on his fossils to prove a particular theory of evolution.

Pure mathematics is sometimes said to be "metaphysics unalloyed," but in any case it is restricted to the category of quantity, and that is not all of metaphysics. Pure mathematics as described by mathematicians is difficult to identify. Russell says it "is the class of all propositions of the form, *p* implies *q*." W. B. Smith would have it that "mathematics is the universal art apodictic." To Poincaré "mathematics is the giving of the same name to different things." Admitting the injustice of these fragmentary quotations, I cite them as nevertheless indicative of a wide divergence of opinion among recognized authorities as to the exact nature of pure mathematics. But as we have here to deal with applied mathematics, or mathematical physics, I think it will be satisfactory to accept Leibnitz's definition: "Mathematics is the science of discrete and continuous magnitude." This statement is readily intelligible and covers both the arithmetical and geometric types. Mathematics, that is to say, has to do with quantity, whether number or extent.

But the particular feature of mathematics which is serviceable to science is the fact that it is an effective instrument for deducing conclusions from measurements. The scientist fits his facts into his mathematical symbols in order to generalize the facts and draw a generalized conclusion, and he is likely to feel that this somehow guarantees the permanent existence and uniform activity of the objects of physics. But mathematics, unfortunately, is not material logic, it does not confirm the facts; it is a restricted type of formal logic, and only tells the scientist what (quantitative) conclusion follows from his (quantitatively) generalized data. Less satisfactory still, the scientist in the process of transferring the data to the mathematics, has recourse to a hypothetical syllogism, which is fair enough, but must use it in an invalid manner. The scientist says, "If matter is constituted in the way I suppose, then this will be the result; but this is the result; therefore matter is con-

stituted in this way." There is of course the possibility of making the syllogism valid, by making it read, "*Only* if matter is constituted in this way." The difficulty is to justify the "only." The scientist may argue that he has tried every other supposition he could think of, and none of them work except this one. But the trouble is that there may well be many conditions he has not thought of, and some of them may work, too. Much has been written about the difficulty of justifying induction, and I think that the difficulty is crystalized in the above familiar syllogism. Hence the scientist, whether he draws his conclusion by the method of verbal propositions or by mathematics, can seldom be sure of what it tells him about the nature of matter. He wishes to learn the antecedent condition which necessitates a particular consequent result. To do so he must use a syllogism which likewise has an antecedent and a consequent. But the antecedent of the syllogism is as baffling as the antecedent condition of nature which he is trying to detect. When, however, he uses mathematics he limits his information still further, he leaves out qualities and has to be satisfied with a quantitative conclusion.

A further difficulty is that mathematical formulae often transcend the quantitative limitations of matter. For one thing, mathematics uses any number of dimensions (as many as there are measurements supplied by observation) whereas matter has room for only three. Again, mathematics can group together a multitude of phenomena and strike an average. It can give the average height of the Rocky Mountains and state the exact size of the average mountain, although there is no mountain in existence of exactly that size. Thus Heisenberg's atom is the "average atom," though no such atom exists. So the scientist who employs mathematics to arrive at conclusions must be careful not to take his conclusions too literally. If the physical law is simply an average, then no individual atom follows that law. The law is a fiction of the averager.

Nature herself has occasioned further difficulties for the mathematical physicist. "Action and reaction are equal," said Newton. Now, mathematics says that if two quantities are equal, then a fraction of one, however small, is equal to a like fraction of the other. But nature refuses to conform. The quantum experiments have shown that for very small (mathematically calculated) action there is no reaction at all. It is no wonder that Einstein and other mathematical physicists are displeased with the quantum. They admitted that there was a limit to the probing of nature with a microscope or with X-rays, but they were sure they could sharpen the edge of mathematics sufficiently to penetrate any secret of nature. Refractory nature, however, blunts the edge of this their finest instrument. So even the quantitative analysis of nature has its limits.

Some physicists, as Jeans, undaunted by these difficulties of mathematical physics, bolt the older scheme and pretend that the real object of science is not what has been commonly thought, not the sensible material world, but some other world back of that, where statistical averages, wave-fogs and multi-dimensional entities exist as such. It is about this world that physics is speaking. Jeans, like Socrates stretched supine under the plane tree, is gazing beyond the world of the journeyman physicist and beyond the island universes of the astronomer.

> But the heavens which is above the heavens [to quote Socrates], what earthly poet ever did or ever will sing worthily? It is such as I will describe; for I must dare to speak the truth, when truth is my theme. There abides the very being with which true knowledge is concerned; the colorless, formless, intangible essence, visible only to the mind.[3]

Socrates indeed is not speaking in mathematical terms, but we may not think that Jeans has given up mathematics and turned metaphysician. To him these entities are still mathematical, and "God is the great mathematician," the Author of a math-

[3] *Phaedrus*, 247. Jowett's translation.

ematical world; the material world is foisted on us by some imp of unreason.

When we are presented with such bizarre results of the mathematical analysis of nature, we are prompted to ask whether mathematics can really serve as an adequate and ultimate basis of science. If not, what then is the ultimate basis of scientific knowledge? Without further ado, we may as well admit that for us humans in this terrestrial life of ours that basis can be none other than metaphysics.

But what is metaphysics? I shall not launch on the hazardous attempt to give a definition satisfactory to everyone. I shall be satisfied to indicate its nature and some of its functions in relation to science. The nature of metaphysics is, I believe, best indicated by its object. And its object is reality—all reality, but especially ultimate reality. Reality means all that exists or can exist independently of our thoughts about it. Metaphysics also takes account of the logical constructs which our minds fashion when contemplating reality, and which, although founded on reality, cannot exist independently of our minds. The purpose of metaphysics is not, as some would suppose, simply the elaboration of our thought. It is a report on realities distinct from our thoughts, and it watches the thoughts themselves to keep them from being mistaken for extramental realities. To simplify its task and to organize its work, it bends its efforts to discovering the ultimates and to grouping realities into certain classes. A convenient classification is Aristotle's: substance, quantity, quality and relation. Substance is that which exists without a supporting subject; quantity is primarily a spatial spread and things derived therefrom; quality is the character or characters which make things different in *kind* from one another; and relation is a reality which cannot subsist in one lone entity, it concerns two or more. All this is very rapid, I realize, but the particular point which I wish to bring out is that, while all the realities thus sweepingly enu-

merated exist, or can exist, independently of our thoughts about them, still, on top of these realities the human mind builds a veritable world of logical constructs, which cannot exist in themselves independently of the mind, but are nevertheless perfectly valid so long as we remember how they were constructed and are aware of the reservations under which we predicate them of reality. It is the business of metaphysics to recognize the different kinds of real beings and at the same time distinguish them all from logical being.

The substitution of mathematics for metaphysics in science was a gradual process. Science first ignored substance, or at best regarded it as something binding together a bundle of accidents. Together with substance it ruled out final causes as intrinsic tendencies of natural agents. Then, encouraged by Locke, it neglected qualities—or, as he called them, "secondary qualities." That left only quantities and the relation between quantities.

We have here a perfect set-up for mathematics, and we cannot wonder that mathematics seized the opportunity. Rather, mathematics had been plotting all along to bring about this very situation. But alas for all its pains, it is now not entirely competent to handle the situation which it has created. Let us take a few instances. Radioactivity is an observed fact. It is the spontaneous emission of certain particles from atoms; atoms, to a degree, explode. But what conditions determine the explosions we do not know, and can never discover. For science, as understood here, that means that no predetermining conditions exist; but where no existing conditions predetermine the conduct of an agent, that agent is acting with free will. Mathematics cannot help. It can only state the probabilities of explosions, based on past performances; just as it can tell how many schoolboys are likely to play "hookey" on a given day. But to accept a natural event as unpredetermined, even one, is to give up all that has been called science. The only hope is to

penetrate beneath the phenomenal and admit that we can know something about the nature of the substances that are acting. There are countless data which show that these substances do not possess free will, and hence cannot exercise it, even though we can never find out the particular factors which predetermine certain of their actions.

Another case is that of light, which exhibits the seemingly incompatible characteristics of wave and particle. Scientists are so non-plussed by this vexatious question that many of them, following Dirac, spurn any inquiry about the nature of light itself, and take the stand that, for science, light between the source and the target, although it takes time to travel, simply does not exist. This is certainly a drastic limitation of science; and although there are metaphysicians [4] who think that such science is sufficiently foreign to metaphysics to be quite competent of itself to function as an independent discipline, it seems to me that this stand lays the metaphysician open to the charge, leveled by Aristotle against Democritus, of "lazily neglecting" his own job. There is no reason why the metaphysician cannot understand that the scientist, in such a case, is limiting himself to what is directly discoverable by experimental methods, and therefore omits, for the time being at least, any decision as to the nature of light itself. Meanwhile the metaphysician can hark back to the invalid syllogism referred to above, and thus see that scientists in the past had no warrant for concluding that light is exclusively a particle or exclusively a wave. Thus we are saved from the obscurantist position that the nature of light must be excluded from the objects of human inquiry.

There is indeed a mathematical theory about the nature of light, wherein light is represented as the "propagation of fog." [5]

[4] Cf., e. g., Y. Simon, "La science moderne de la nature et la philosophie," *Revue Néoscolastique de Philosophie*, Fév., 1936.

[5] Cf., e. g., A. S. Eddington, *New Pathways of Science* (Macmillan), p. 44.

The mathematician fogs the particle to make it appear like a wave. This is a perfectly valid construct, valid for what it is—a construct. Understood in that sense it is an exact representation of the doubt, or "probability," reported by experiment. "Mathematics," said an experienced teacher, "is an exact science about sciences that are not exact." But if the mathematician or the scientist goes on to say that anything *is* simply what it is *known as,* the metaphysician will interpose to call attention to the fact that logical entities are not real as such, their foundation alone is real.

The reader will doubtless wish to remind me that mathematics has solved many problems of physics, particularly in the very practical fields of chemical and electrical engineering. There is a story current about a railway company in search of electrical locomotives of sufficient power to take the trains over the Continental Divide, but whose experts were stumped because all their formulae for the right type of motor involved the square root of minus one. Then Steinmetz was called in. Undaunted by the mathematical surd, he forged ahead, and succeeded. The square root of minus one put the trains over the Divide. Here is a case where mathematics pulled a bigger load than metaphysics ever hauled. But the previous mathematicians had failed because they mistook the square root of minus one for an empty symbol, whereas Steinmetz was metaphysician enough to know that there was something corresponding to it in the material world, something that did not look a bit like the square root of minus one, but for which the symbol was a logical construct; and he had the genius to pick out the thing for which in this case it stood. So, it seems to me, metaphysics pulled the load after all.

No one can deny that mathematics is useful in promoting inventions, in suggesting lines of research, useful in classifying and formulating the observed phenomena of nature. But that, without metaphysics, it really explains anything is hard to see.

Unfortunately, the ordinary scientist feels that when he has put his data into a mathematical formula he has explained the data. The fact is that he has merely succeeded in stating the law succinctly, by a sort of "shorthand," and has done so only quantitatively. Meyerson's exhaustive examination into this matter results in the verdict that a scientific explanation of this sort is nothing more than a statement of the quantitative identity between two sets of phenomena. It is at most a refinement, restatement and development of the observed uniformity of nature.

Even in that, however, mathematics sometimes fails. The classical physics represented light as a wave, spreading out from the source in an ever-expanding sphere. Hence if you take a very small section of the wave, you should have a very small quantity of energy, and there should be a very small reaction in any object in that part of its path. But we find that there is simply *no* reaction in countless sectors of the wave's incidence. Atoms subjected to light do not absorb energy share and share alike, one atom "hogs" it all, and the rest go without. This is called the photo-electric effect. What does mathematics say? It gives us alternate hypotheses. It says that when light lumps its energy, it is a particle; when it diffracts or interferes, it is a wave. This seems to leave us with the old canard, nature is what nature does.

In science, explanation is usually a correlation of past facts which may be used as a working hypothesis for future confirmation or discovery. Hence we are faced with the question: What is genuine explanation? It seems to me that to explain anything we must take the thing to be explained and connect it with primitive experiences such as we all have. In that Einstein is right. But I cannot agree with him that the development of concepts from sense experiences is "incomprehensible," nor that their applicability to new sense experiences is a "miracle." For among our primitive experiences are the conscious acts of

prescinding one thing from another. By means of these acts we can point out how the thing to be explained is connected with sense experience. In the same manner we discover the difference between the mind and the object, and that certain things can exist in the concrete independently of the mind, while others are so abstract that they are as such totally dependent on the mind. We all have primitive experiences which we can identify under the headings of quantity, quality and relation, and by conscious analysis of the whole body of our experiences we discover the difference between substance and accident, and between material and immaterial. And we see that things in these four categories can exist independently of the mind. Thus by a perfectly conscious process we experience a difference (and this is psychologically sound) between the concrete and the abstract, between mind and object, between real being and logical constructs. To my mind, that is metaphysics, and that is explanation. The metaphysician, as well as the scientist, must be careful not to ignore any fact in his field (and the metaphysician's field is the whole field), and everyone must be at special pains to note how the development is carried out. Mathematics is restricted to quantity and the relations of quantities, it disregards other relations and omits substance and qualities as such. Science, and particularly mathematics, must be embodied in metaphysics; otherwise they become incapable either of satisfying the human mind or even of solving their own problems.

What is perhaps the most acute case of the need of metaphysics is exhibited in the scientific concept of causality. Let the scientist keep his meaning for causality, namely the orderly sequence of events such as can be written down as a law. In this the scientist prescinds from the notion of efficient cause as the producing agent. It must not however be thought that he prescinds entirely from *formal* cause, for it is clear that he is interested in what *kind* of event will follow from a given *kind*

of event. Indeed, without some remnant of formal cause there could be no knowledge at all. But, even understanding causality as a mere sequence, the scientist encounters insuperable difficulties in the case of *continuous* change; because in external nature changes that are continuous have not an antecedent state which is discretely separated from the subsequent. There is no line drawn by nature where the antecedent ends and the subsequent begins. Hence, while the scientist may use the term "causality" to express mere succession, without caring whether the antecedent produced the subsequent, he must admit that the separation of the two is, in the case of continuous change, extrinsic to the actual fact, and largely arbitrary. If he insists that the antecedent is really separated from the subsequent in the actual world, he must deny continuous change altogether, and, with Whitehead, postulate that events come in discrete sections or "slabs"; that the entire world, in each immeasurably brief instant, or "quantum," of time, goes out of existence, and another world, slightly different, springs up in its place. That postulate is so outlandish that not even Whitehead himself seriously subscribes to it. But if there *are* continuous changes in the external world, then the Humian concept of causality, as merely previous and subsequent phenomena, cannot be applied there; and metaphysics is reinstated. Doctor Geyser has hinted at this demand for metaphysics by employing continuous change as a scientific proof for efficient cause. The intimate relation here between act and potency forces metaphysics upon the scientist.

In fact the regular sequence notion of causality has been rendered inadequate by irregularities which cannot be accounted for. There are certain disturbances in the course of natural events, and the smaller the scale the more you will find; that is to say, there are individual particles which, so far as observation goes, do not act according to any known law, so that, even aside from the free tinkering of man, nature herself

seemingly is suffering from deepseated disorder. How then can nature continue to carry on with so much as a semblance of order? Why do not these disorders spread, as it seems they must, and quickly wreck the entire machinery of the world? There is no answer unless we take cognizance of qualities as well as quantities, and from qualities go on to the knowledge of substance with intrinsic tendencies which, when things go wrong, serve to bring nature back to her normal performance. St. Thomas says that although we start with sense-data and go on to purely metaphysical concepts, we must bring these realities back to the material things where our knowledge began, and he explicitly mentions "substance, quality, potency and act."[6] The need of admitting these realities in the scientific audit of the world has been made acute by the "indeterminacy" of nature, for on the simple basis of quantity and mechanics the observed disorders should spread like wildfire. They do not spread, but are to a degree corrected. Hence mechanics and its ally mathematical physics do not give the whole answer. Nor can science ever get an adequate answer until it bolts the restrictions put upon it by Galileo, Locke, Hume and the mechanists, and turns again to metaphysics in the only hope of a satisfactory account of nature.

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[6] *In Boet. de Trin.*, Q. 5, a. 1 (corp.).

BOOK REVIEWS

Christian Social Reconstruction. By VIRGIL MICHEL. Milwaukee: The Bruce Publishing Co., 1937. Pp. viii + 137.

Dom Virgil has put together a series of lectures originally delivered under the Central Verein Institute of Social Study, at St. John's University, Minnesota. The purpose is twofold: first, to give a more adequate idea of the Encyclical of Pope Pius XI "Quadragesimo Anno" than can readily be gathered by reading the Encyclical itself. The Encyclical, however, is not included in the book. The second purpose is to indicate how basic social justice can be developed into a new order of society. In this new society justice is to prevail; the relation of employer to employee, of land owner to him who is destitute of ownership, or the thrifty person who has saved his money, to the careless individual who is in want and need, are carefully outlined. Stress is laid upon the social nature of human society and of man. Social justice is said to be what was formerly called general or legal justice, although some distinction must be made today between the two terms.

The main difference between social and legal justice is one of scope. Social justice has as its object the general good or the common interests of society as distinct from the particular good, or particular interest of any individual members. It aims to relate or direct our action properly toward the common good of the society of which we are the members. This social justice becomes legal justice when definite laws have been enacted to govern the actions of the members of the community. The project, however, of social reconstruction when developed in some detail involves a corporative order which will do away with the evils of the individualism which prevails today.

The State is a natural society which has other functions than the prevention of crime and the settling of disputes between individuals. Economic interests may require the intervention of the State. But ownership of property is twofold: individual and social. If I have some good thing, in a certain sense every member of society has an interest in that good thing. This does not mean he has a claim upon it, but there may arise circumstances in which the intervention of the State will be required in order to settle with precision how far individual ownership reaches and what I may have to give up for the sake of the common good. The new social order will be corporative. The meaning of the word "corporation" in the Papal Encyclical is not clear to many people.

Dom Virgil says that the word "corporation" signifies "guild." Italy today is organized into corporations: in the sense of the Encyclical of Pius XI the word "corporation" does not mean one of the organized branches of this particular corporate state. Again corporations does not necessarily mean a labor union of the type hitherto common in America. The Encyclical rather has in view a complete industrial partnership, in which employer and employee mutually agree and in which the carrying out of the agreement is supervised by public authority. We may recall that in 1903 under President Theodore Roosevelt when the Anthracite Coal Strike was settled, the arbitrators pointed out that in all industrial agreements there are three parties concerned: e. g. first, the employer; second, the employee; and third, the public. The reason why the public which in a new social order will express its rights through the State is concerned is this, that any man who enters into a business in a public way, especially when his business becomes large, such as the automobile trade, contracts obligations not only of ownership but of supply as well. The public are concerned with the upkeep of his factory and in the steady flow of goods to be sent out. They have been educated to rely upon him for production, and they thus acquire a kind of right to know the manner in which production is carried on and to know that the condition of the working man, the factory, the fields which produce his goods are safeguarded so that all his rights will be protected.

Dom Virgil does not outline in detail precisely what will be the internal construction of society under this new social organization. He does, however, make clear on the basis of Scholastic philosophy, just how by reason of the common good, the State is able to exercise a supervision over the affairs of private individuals. No man can cut himself off from civil society; we are born into families, and we all belong by nature to civil society. The common origin and common destiny of all men make them in a sense all brothers; wherefore there is a bond of unity between them all by reason of which each one is obliged to look not only to his own good but to the welfare of his neighbor and of all mankind.

F. A. Walsh.

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What Plato Thinks. By Gustav E. Mueller. La Salle, Illinois: The Open Court Publishing Co., 1937. Pp. vi + 128.

Here is an invaluable work for one who has a knowledge of Plato's writings. The author shows a deep love for his subject, which at times

leads one to suspect that were the question raised he would place Plato a bit too high in the history of philosophy.

He deals with Platonic love, the influence Socrates had on Plato, the soul, wisdom and philosophy, the philosophy of beauty and art, dialectical idealism, and God. Especially worthy of note is the chapter on dialectical idealism. This is a timely topic and one that shows better than any other the true Platonic philosophy. Dialectic is the doctrine of the Idea itself. With this Plato's philosophy stands or falls. The author shows the evolution of this from pre-Platonic philosophy. But Plato must not be pictured as a mere compiler, the theory of Ideas is his original contribution to philosophy.

The work is not a critical appreciation of Platonism, but consists rather, in the answers Plato would give to the various problems confronting philosophy. Originally several of the chapters were published in some of the philosophical journals of the United States. This accounts for the seeming lack of continuity between the chapters. Perhaps more references to the texts of Plato would help the work in its avowed purpose "to be helpful in making conversation with Plato more real."

Aristotle does not fare any too well in the comparisons the author draws between him and Plato. There is no doubt that when elegance is considered the Stagirite does not rank with Plato, but in considering their relative contribution to philosophy Plato must take a subservient rank.

Doctor Mueller it is hoped will continue his aim of making Plato's works more popular with those bent on obtaining a truly comprehensive knowledge of philosophy. Plato's works are still the best example of philosophical style and as such their perusal is to be encouraged. His teaching is not of great value but he prepares us to appreciate truth wherever we may find it.

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Sur La Philosophie Bergsonienne. By Joseph De Tonquédec. Paris: Gabriel Beauchesne, Editeurs, 1936. Pp. 241.

This volume is composed of five articles which the author wrote a number of years ago on various phases of Bergson's philosophy. First of all, there are two articles on the concept of God as found in *Creative Evolution.* The first of these studies appeared in *Etudes* in 1908; the other, in the same periodical in 1912. The two following articles are

on Bergson's *Two Sources of Morality and Religion*; these were first published in *Etudes* in 1932 and 1933. The volume then concludes with an Appendix containing an appreciation of Bergsonism from the viewpoint of Scholastic philosophy; this study appeared originally in the *Revue critique des Idées et des Livres* in 1913.

The desire of the author to gather together the various articles which he had written on Bergson's philosophy undoubtedly accounts for their re-edition in the present volume. And although some of these studies were produced quite a few years ago, they retain sufficient value to justify their publication at the present time.

The first two studies in the volume offer an exposition of the concept of God as presented by Bergson in his *Creative Evolution*. In the first article the author endeavors by a study of the text of *Creative Evolution* to discover Bergson's answer to the question: How should one interpret the order in the world? In the second article the author again analyzes the text of *Creative Evolution* in an effort to answer another question: Is Bergson a monist?

In their favor it must be said that these two studies do offer an accurate textual exposition of the concept of God as found in Bergson's *Creative Evolution*. Taken together they form one of our finest analyses of this particular work of Bergson.

On the other hand, certain limitations of value and evidences of incompleteness naturally result from the publication of these articles in an unchanged form twenty-four years after the date of their composition. First of all, they do not profit by the rather extensive critical study of Bergson's philosophy which some highly-recognized scholars have made during this period of years. Secondly, Bergson himself has since produced his *Two Sources of Morality and Religion*. And any study of Bergson's concept of God which does not consider his one work which is primarily concerned with this subject necessarily has but a limited value.

The incompleteness of these studies is most evident, perhaps, in the second article, which was written in 1912. Here the author endeavored by a textual study of *Creative Evolution* to discover whether or not Bergson's philosophy is monistic. Now, as is well known, Bergson's *Two Sources*, published five years ago, contains more matter on this topic than all his earlier works combined. All of the passages in this later work wherein Bergson describes the contact of the mystic with God would certainly have to be considered in any adequate study of Bergson's possible monism.

The third and fourth articles in the volume were written about four years ago after the publication of Bergson's *Two Sources.* In the first of these two studies the author presents a textual analysis of Bergson's early works, principally his *Creative Evolution.* This analysis is made with the purpose of portraying what might be called the Bergsonian metaphysical basis of *Two Sources.* Following this preparation the author then logically proceeds to an exposition of the concepts of God, religion, and morality as found in the text of *Two Sources.*

The author of this volume has been an interested and capable critic of Bergson's philosophy for more than thirty years, and those who have a special interest in this subject will undoubtedly appreciate his publication of these articles in a single volume. On the other hand, it must be said that most of these articles now possess value only in so far as they are fine textual analyses of Bergson's earliest works. The fact that three of these studies, written twenty-four years ago, are published in an unchanged form naturally prevents their profiting by the various works which recognized scholars have published on Bergson during the intervening years. The same is true, in a lesser degree, of the two remaining articles written four years ago on *Two Sources,* because since 1933 most of the philosophical and theological reviews have offered excellent critical analyses of Bergson's volume; and at least three Catholic philosophers have produced books during the past four years on Bergson's concepts of God, religion, and morality. It is unfortunate that the author did not see fit to take these facts into consideration, and for this reason we are prevented from bestowing upon the work our unqualified praise.

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Meister Eckhart. Die deutschen und lateinischen Werke. Herausgegeben im Auftrage der deutschen Forschungsgemeinschaft. Die deutschen Werke, erster Band, ed. Joseph Quint: Meister Eckharts Predigten, 1./2. Lieferung (S. 1-176 mit Einleitung und Abkürzungsverzeichnis); die lateinischen Werke, erster Band: Prologi in Opus Tripartitum, Expositio Libri Genesis secundum recensionem Cod. Ampl. Fol. 181 (E), ed. Konrad Weiss, 1. Lieferung (S. 1-80); dritter Band: Expositio Sancti Evangelii Secundum Iohannem, ed. Karl Christ und Joseph Koch, 1. Lieferung (S. 1-80 mit

Einleitung und Abkürzungsverzeichnis); fünfter Band: Collatio in Libros Sententiarum, ed. Joseph Koch; Quaestiones Parisienses, ed. Bernhard Geyer; Sermo Die B. Augustini Parisius Habitus, ed. B. Geyer; Tractatus Super Oratione Dominica, ed. Erich Seeberg, 1./2. Lieferung (S. 1-128). Stuttgart-Berlin: Verlag W. Kohlhammer, 1936.

It is an indication of the intellectual unrest in present-day Germany that the oscillating genius of Master Eckhart exercises such power of attraction and fascination as to warrant two separate editions of his works, one of which, containing only the hitherto practically unknown Latin writings, was reviewed by A. K. Ziegler in *The New Scholasticism*, vol. XI, No. 2, p. 180 sq. After centuries of neglect and decades of misinterpretation at the hands of agnostics or liberal Protestant theologians, Eckhart seems to have come into his own. At present he even occupies the center not only of metaphysical controversy but of a regular "Theologengezänk," one party claiming him as the quintessence of a truly Germanic depth of metaphysical and theological speculation, others decrying him as a disciple of the Jewish philosopher Maimonides and therefore constituting a danger to the integrity of Germanic thought.

The edition of his German and Latin works with which we are concerned here is sponsored by the "Eckhart-Kommission der Deutschen Forschungsgemeinschaft" and its president, the well known Protestant theologian, Erich Seeberg. Looking over the rather long list of committee-members and editors we find that most of them are non-Catholics, a mere factual statement which gains a certain significance, however, when we discover that some important phases of research activities are not given due emphasis in the introductions whereas the dilettantic and misleading popularizations of such men as Büttner and Lehmann receive unqualified and undeserved praise. It is also illuminating to note that the parallel-edition of the Latin works, published by Felix Meiner, is denounced by some German critics because of the international flavor of its editorial staff and particularly because the Aryanism of Klibansky is not beyond suspicion. It is regrettable at any rate that an enterprise of such scope and merit could not have issued from a more compact combination of forces, from a realization of the supernational ends of science and philosophy that would contribute to a growing international mutual esteem and understanding.

Such critical reservations should not detract, however, from the inherent admirable qualities of the undertaking. The complete edition

will comprise six volumes of Latin writings in addition to the better known German works which are rendered in the original Middle High German. The Latin works are supplied with a German translation while both the Latin and German works are provided with a critical apparatus of annotations, variants, source-identifications, quotations of parallel-passages, etc. Included among the German works are all those pieces that have been discovered and edited since Pfeiffer's original edition. The apparatus provides the necessary tools for a critical comparison of text edition and MSS. Joseph Quint very aptly remarks in his introduction that a critical edition of Master Eckhart's German Sermons presents one of the most intricate problems of mediaeval textual criticism. The second apparatus with its comprehensive listing of all obtainable variants testifies eloquently to the scholarly merits of this edition. The third apparatus, aside from references to parallel-texts and the identification of source material of the patristic and scholastic epochs, contains part-translations and explanations of difficult passages, most of them of a philological nature. It is the editor's opinion that the task of textual and linguistic research in connection with this profound German thinker and "Sprachschöpfer" rests exclusively with the representatives of Germanic philology. It is quite certain, however, that both theological and philosophical research will be greatly stimulated by a more intimate and adequate acquaintance with one of the greatest masters of mystical theology and his Neo-Platonically colored brand of Thomism. There is little doubt today that Denifle's criticism of Master Eckhart was too sweeping and summary when he denied Eckhart's writings the attribute of originality of thought. While the discovery and publication of the "Rechtfertigungsschrift" makes it clear that the Master never really transgressed the boundaries of orthodoxy, his speculation in German as well as in Latin presents ample evidence of a startling, often paradoxical and most unconventional individuality.

Joseph Quint as General Editor of the German works is aided by A. Spamer and M. Pahncke, while Joseph Koch is in charge of the edition of the Latin writings. He has prefaced his part of the undertaking with a most excellent and erudite exposition of the guiding principles of the edition, and with a careful description of the MSS, as to contents, character, and historical background. The critical apparatus deserves the highest praise. The translation, on the whole running smoothly and fluently, appears at times somewhat free (cp. fasc. 1, p. 8: "conceptio actualis": "lebendiger Entwurf"). Koch wants it to be understood that it is the primary purpose of his edition to make Master

Eckhart's writings live again. He refrains from a theological or philosophical interpretation of Eckhart's work which he considers a most important task but one with which the editors are not immediately concerned.

The admirable enterprise is to be welcomed as a manifestation of the enduring qualities of sound German scholarship in these trying times, and as a most gratifying symptom of a growing appreciation and fuller recognition of the towering greatness of the accomplishments of the mediaeval mind.

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NOTES AND COMMENT

We record with sorrow the death of the Reverend Leo W. Keeler, S. J., professor of philosophy at the Gregorian University, Rome. He was a member for many years of the American Catholic Philosophical Association and a frequent and valued contributor to THE NEW SCHOLASTICISM. The July, 1937, issue contained a learned study by him, entitled "The Dependence of R. Grosseteste's *De Anima* on the *Summa* of Philip the Chancellor." Notice of his death reached us just before this issue went to press. His death occurred when an automobile in which he was riding skidded off the road near San Jose, California.

The School of Philosophy at the Catholic University of America has been set up with its own dean and faculty. The Dean is the Very Reverend Ignatius Smith, O. P., Ph. D.

The Institute of Mediaeval Studies at Notre Dame announces a series of new courses.

The annual meeting of the American Catholic Philosophical Association will be held in New York at the end of December. The program is about completed and should reach members in ample time. There will be one joint meeting with the American Philosophical Association.

The announcements of books received will be ready for the January number. Reviewers are asked to send in their reviews as promptly as possible.

CURRENT PHILOSOPHICAL REVIEWS

Antonianum—October, 1936.

P. Bernardua Badoux: *Quaestio de Philosophia Christiana.* A synthetical and methodical exposition of the controversy: Whether any philosophy whatever may legitimately claim to be Christian; written for professors of philosophy; gives a bibliography, history and meaning of the question, the clash between mediaeval and modern philosophers and a thorough examination into the whole problem of a Christian Philosophy.

The International Journal of Ethics—Vol. XLVII, No. 3: April, 1937.

Gerhart Husserl: *Justice.* A detailed inquiry into the logical structure of law, postulating equality as the decisive criterion of justice. **George Morgan, Jr.:** *Whitehead's Theory of Value.* A brief analysis of the essentials of Whitehead's subtle and complex theory of value which is based largely on the themes of plurality, relativity, and flux. Whitehead's philosophy includes values from the start. For him, all actual entities have value. Thus value and actuality are intimately associated if not strictly identical. Such a doctrine is possible for Whitehead because his metaphysics describes ultimate actualities, not as isolated substances, but as acts of experience related by mutual immanence, each act of experience gathering a perspective of the world into a unity of feeling. **Charles E. Clark:** *The Higher Learning in a Democracy.* This former teacher of Doctor Hutchins agrees with him that American higher learning has become overdiffuse and thin, but differs from him as to the emphasis, methods of organization, and purpose of education. **W. Preston Warren:** *Philosophy, Politics, and Education: Our Basic Dilemma.* Ought education aim preeminently to produce propagandists and politicians whose objective is to fool as many of the people all the time as is psychologically possible, or should it attempt to develop men who are sufficiently philosophic and scientific to maintain personal and social autonomy in the midst of the confusing claims and disruptive forces of the modern world? **Discussions:** This section contains four reactions to President Hutchins' views on education. These discussions show a uniform tendency to intersperse remarks concerning ideas and knowledge, history, the professions, and the disciplines among statements concerning Dortor Hutchins and to justify criticisms of his doctrines by setting up opposed theories of knowledge and by seeking substitutes to serve in the place of the intellectual disciplines as training for life as they conceive it. It would appear that President Hutchins is substantially correct in his criticism of present practices in education, but his positive suggestions would seem to show sometimes that he is mistaken in his conception of science, sometimes that his political devices are inconsistent with democratic ideals, sometimes that his notion of psychology is not in acord with principles which have recently guided educators, sometimes that he is impractical.

The Personalist—A Quarterly Journal of Philosophy, Religion and Literature. Published by the School of Philosophy, University of Southern California. Spring 1937.

George Dykhuizen: *The Early Pragmatism of Josiah Royce.* The author briefly traces the evolution of Royce's thought from the time he professed pragmatism until he arrived at a theory of knowledge based upon a form of absolute idealism. He emphasizes the influence of William James and Berkley on Royce and how the latter evolved his own theory from their systems. How, in answer to the question, what is error? Royce came to the conclusion that if the possibility of error is to be made intelligible we must hold to the existence of an all-inclusive and all-knowing mind. **Louis J. Hopkins:** *Darwin and His Interpreters.* A castigation of those scientists and philosophers who have claimed that Darwin's explanation is a materialistic and mechanistic one. The author examines the theory to prove his thesis. He places the blame chiefly on the biologists and on the "devastating and deadly effects of Aristotelian logic." **Ralph B. Winn:** *Logic, Living and Dead.* An attack on the logicians and especially on the syllogism. The author recapitulates the objections of Descartes, John Locke, John Stuart Mill, Thomas Brown and F. C. S. Schiller. The enthymeme is the typical form of thinking adapted to practical use. The syllogism is criticised because it is not adapted to all the circumstances of life. Formal logic is faulty because it assumes that reasoning consists in building chains of isolated propositions. **Ph. Kohnstamm:** *Types and Meaning of Personalism,* translated from the Dutch by Hendrikus Sjaardema. The various meanings given to personalism throughout the history of thought. The author contrasts his notion of person with that of Stern which includes not only man but also plants and animals. In the personalism of the author we see ourselves and our equals as the creatures of one God, Who is a Person in the Biblical sense, i. e., Who Wills and Knows and Who places Himself in relation with human beings modelled in His image by revealing Himself in the world of Space and Time, in a Person, Jesus Christ, Whom we acknowledge as our Lord.

Zeitschrift für katholische Theologie—Herausgegeben von der Theologischen Fakultät der Universität Innsbruck. 60 Band 1936, 4. Heft.

Josef Santeler: *Ist das Kausalprinzip ein blosses Postulat?* The author gives a thorough treatment to the question of the validity of the principle of causality.

Philosophy—Vol. XII, No. 46: April, 1937.

Eustace Percy: *Culture, Philosophy and Faith.* An attempt on the part of a layman in philosophy to explain the successive role of faith, philosophy and culture in human history. Religion becomes hardened into a cult on the ruins of which rises philosophy. But this at first exacting in its intellectual demands, gradually becomes softened into a culture against which men finally revolt, and a new religious cycle begins again. At present we seem "to have reached that point in the cycle of thought when men are

likely to turn from philosophy to a new religious faith," not a mere revival but something revolutionary, a rising passion born of intellectual and moral disappointment. The author believes this religious faith will in the long run be inimical to Western civilization, which can be saved only by the birth of a philosophy which sees the necessity of making an act of faith. **Wm. Pepperell Montague:** *The Story of American Realism.* Professor Montague, one of that original band of new realists in America, gives a brief history of the Realistic movement in America, outlines its principle tenets which are a reaction to idealism and pragmatism, the points of divergence among the new realists themselves, and what he believes to be the fallacies of the movement, namely behaviourism and objective relativism. The author then goes on to explain the position and the contributions of the critical realists and concludes by pointing to the new invigorating spirit which realism has given to American philosophy. **John Laird:** *Contemporary British Realism.* This discussion centers mainly about an analysis of Moore's *Refutation of Idealism*, which was largely responsible for the movement called realism in pre-War Britain. While Professor Laird questions whether Dr. Moore could be called a realist in the present acceptance of the term, he at least aroused many philosophers from their "idealistic slumber," and caused idealism in Britain to be badly shaken. The author then goes on to explain three points, which have bearing on an epistemological realism, in the light of Moore's *Refutation*, and subsequent British philosophers, particularly Russell. Thus, (1) Do acts of pure awareness exist in the sense alleged? (2) Is it legitimate to treat the act-object analysis as an absolute prius in all epistemology? (3) Are all the "objects" of such "acts" existentially distinct from the acts, or only some or none? The conclusion reached seems to be that while most contemporary British philosophers are committed to a realism of some sort, the varieties of realism are so many and so shifting, that in the words of Mr. Alexander, "As to the terms 'idealism' and 'realism,' I should be heartily glad if we might get rid of them altogether." **B. M. Laing:** *Hume's Dialogues Concerning Natural Religion.* A discussion of Professor Kemp Smith's new edition of Hume's *Dialogues Concerning Natural Religion.* The Dialogues center around the question of the validity of the teleological argument for the existence of an intelligent Creator. Professor Kemp, according to Laing, interprets them as an expression of Hume's skepticism, since he identifies Philo, the skeptic, with Hume. Dr. Laing, however, disagrees with this view, maintaining that the Dialogues are not "an expression of a personal attitude on the part of Hume . . . but a discussion on evidence . . . religious issues being employed as a medium for a detached examination of logical issues." **D. J. Allan:** *Nature, Education and Freedom According to Jean-Jacques Rousseau.* A discussion of Rousseau's treatment of nature, education and freedom, particularly as these are expounded in his three works, *Discourse on Inequality*, *Emile*, and *Contrat Social.* The author's thesis is that Rousseau was a constructive rather than a destructive thinker, and that in his writings he more than merely exposed the false basis of society, but endeavored to show how real freedom and real education are those more in harmony with man in his natural state, that is to say, in his human

rather than artificial state. **Oliver Quick:** *Knowledge, Action and Religion.* In this article the author discusses the relation which knowledge bears to action and religion. He contends that in the philosophy of the Catholic Church, theory takes precedence over practice, and action is for the sake of knowing. The contemporary point of view is the reverse. He then goes on to investigate the knowledge situation in order to discover its bearing on action and religion, and concludes that it is the universal significance of the particular that gives spiritual insight, and that while in this world knowledge should be subordinated to action in the "higher world it is otherwise," and it is the reality of that higher world which gives purpose and meaning to change in this life.

The Journal of Philosophy—Vol. XXXIV, No. 4: February 18, 1937.

Barnett Savery: *The Relativity of Value.* Goodness may have one of four meanings: (a) no meaning, (b) a constant meaning, (c) an ambiguous meaning, (d) a relative meaning. Value-relativity, "being an end of action" is the meaning of Generic Goodness: an "end of action" is a specific meaning of goodness; the specific "end of action" which we adopt is the result of will-attitude. No other solution seems possible to the author. **Irwin Edman:** *A Philosopher's Contentment.* A brief exposition of the doctrines of Edgar A. Singer on the ambition of the philosopher. The philosopher aims at high doctrine, not disciplined analysis. His ambition lies in the dissipation of the 'uneasiness' that comes from intellectual ambiguity and moral ambivalence. The reflective mind finds the end of all desires, all goods, and all ideals in the Absolute or in Nirvana. The counsels of science will direct the philosopher to this goal.

The Journal of Philosophy—Vol. XXXIV, No. 5: March 4, 1937.

Harold Chapman Brown: *Ethics from the View Point of Modern Science.* The first step toward improving men is to improve, reconstruct if necessary, the institutions that shape the activities by which they keep alive. The basic virtues are essential to the fulfillment of the will to live socially and they can only rise and flourish under the proper economic institutions. Ethics is sterile because it has divorced itself from economics. **J. W. Miller:** *Accidents Will Happen.* Idealism has been strong in claiming for the mind the order of experience, and weak in dealing with content. It has not, as a rule, made the accidental necessary. The accidental is an ontological concept, defining a condition of a world, and of a lawful world. Only in this lawful infinity can freedom be found or the secular become sacred.

The Journal of Philosophy—Vol. XXXIV, No. 6: March 18, 1937.

W. Donald Oliver: *Substance as a Locus of Meaning.* Mill's canon of difference is applied to substance to decide the latter's function and necessity. Modern science has not outgrown the idea of a substantial-principle. Substances are necessary in order to fit the material of our different individual experiences together into a consistent objective whole. No inquiry is likely to be more constructively fruitful than one into the location of meaning in knowledge situations. **Newton P. Stallknecht:**

The Place of Verification in Ethical Theory. The author criticizes logical positivism for its reduction of value judgments to imperatives and the subsequent denial that an imperative constitutes an assertion of anything more than the desire or volition of the speaker. Before we can convince anyone of the desirability of the Socratic imperative we must ask him to put the imperative to the test of his own self-knowledge.

The Journal of Philosophy—Vol. XXXIV, No. 7: April 1, 1937.

Milton R. Konvitz: ***An Examination of Professor S. Alexander's Theory of Truth.*** Alexander accepts the coherence theory of truth. But what he really means is that the test is the correspondence of a system of ideas to a system of ideas a system of reals. **Arthur Lapan:** ***The Causal Situation.*** An analysis of the traits in virtue of which things have been said to be causes. Cause as novel factor and cause as condition are simple discriminations within the causal situation.

The Journal of Philosophy—Vol. XXXIV, No. 8: April 15, 1937.

George Boas: ***What is a Problem?*** A paper read at a meeting of the American Philosophical Association in Cambridge, Mass., December 30, 1936. Knowledge is supposedly acquired in answer to specific questions; questions not about the rule, but about deviations from the rule; questions themselves arising from the prior acceptance of certain ideas. **Mortimer Taube:** ***Positivism, Science and History.*** A documented protest against positivists', and particularly A. J. Ayer's, ignorance or distortion of the real opinions of great philosophers. **Herbert W. Schneider:** ***Laird's Enquiry into Moral Notions.*** A review of John Laird's *An Enquiry into Moral Notions* (New York: Columbia University Press, 1936. 318 pp.) which is here characterized as a "penetrating critique of Ross' ***Right and Good*** . . . , adding to a critique of the right and good a critique of virtue. . . ."

Revue de l'Universite d'Ottawa—April-June, 1937.

Pere Louis-Marie: ***Les Problemes de l'heredite.*** A classification and discussion of the principal theories on the material seat of heredity with a brief treatment of the nature of the genes.

In most of the theories advanced, the elementary notions of Primary Cause, intentional finality, and Providence are totally ignored. We should, at least, distinguish between the seat of the vital principle and the vital principle itself in the living body.

The Review of Religion—Vol. I, No. 3: March, 1937.

Eugene W. Lyman: ***Bergson's Philosophy of Religion.*** This lengthy article considers first, Bergson's views concerning the factual material on religion and morality; and secondly, the relations of these views to his metaphysics. His book, ***The Two Sources of Morality and Religion,*** quoted throughout the article, carries a positive metaphysics, which guides the working out of his philosophy of religion. Summed up, his philosophy of religion is this: morality and religion have two sources, social instinct and mystical intuition, from whose functions there results both closed and open morality, and both static and dynamic religion. **John Clark Archer:**

Saṁkara and the Hindu One. The author scrutinizes Indian thought in its elements: the Upanishads, the Vedānta, and Saṁkara; and proceeds to answer the questions: Are these well-known elements synonymous? Is Indian philosophy some sort of thorough-going idealism? Is Saṁkara a "monist" and a true expounder of Vedānta and the Upanishads? If the Vedānta is Upanishadic, are the Upanishads Vedantic? **Bernard Eugene Meland:** ***The Faith of a Mystical Naturalist.*** Man's life on the universe is conditioned by environing forces of nature, the exact character of which and the relation of one to the other is not altogether clear; yet their operations in relation to the human species and other forms of life, are constant enough to suggest a Creative Order. This Creative Order, growing toward increasing organic unity, the mystical naturalist terms GOD, believing that this reality is worthy of man's full devotion. One other article appears in this issue: Raffaele Pettazoni, ***A Functional View of Religion.***

Revue néoscolastique de philosophie—Tome 40 (Deuxième Série, No. 53): February, 1937.

H. Hayen: ***La Théorie du lieu naturel d'après Aristote.*** Aristotle gave only one definition of natural place and proposed but one theory. After applying this definition to Aristotle's notion of the universe and the heavenly sphere and to his theory of the four elements, Father Hayen concludes that it is a way to a deeper understanding of the theory of matter and form. **W. J. Dwyer:** ***Le texte authentique du "De aeternitate mundi" de Siger de Brabant.*** This article appraises the four known manuscripts of Siger's work. The greater order and conciseness of manuscript B (discovered by Mandonnet in Paris) suggests it is the best text. Its omission, as compared with A, C and D, can be reasonably explained. While Father Dwyer thinks this conclusion valid on the evidence at hand, he allows for modifications, should further manuscripts be unearthed.

Harvard Theological Review—Vol. XXX, No. 2: April, 1937.

Harold Mattingly: ***The Roman 'Virtues.'*** A statement of the problem of the development of 'virtues' as personifications in Roman polytheism and their subsequent absorbtion into Christianity. The terms 'virtue' and GENIUS are defined. Considered first as activities of the gods, each virtue was made into a new non-personal god. Later, as exemplified in the Principes of Rome they became personal in a sense. Victorious Christianity absorbed these pagan 'virtues' as powers of God, capable of being emulated by simple man.

Rivista di filosofia neo-scolastica—Anno XXIX, Fasc. 1: January, 1937.

This issue contains the outline of studies, the courses and programs of the Faculties of Letters and Philosophy, and of Pedagogy, in the University of the Sacred Heart, Milan. Undergraduate courses and courses in ***scuole di perfezionamento,*** to which are admitted only those having degrees, are listed. There is adjoined a list of graduates and publications, both of dissertations and of faculty productions.

Grazioso Ceriani: ***Religione e filosofia nel pensiero idealistico e nella***

gnoseologia tomistica. A study in theology and metaphysics. An attempt is made to face the universe, integrally and by direct congition, without appeal to any reflex position. God is the center: from Him come forth the varying degrees of created being, all governed and guided by His divine Providence. This is contrasted with the absolute Spirit of Gentile, the autoconsciousness of Carlini, the symbolic transcendentalism of Martinetli, and the various modifications of the school of Blondel, especially the idea of God in *La pensee.* **P. Leon Veuthey, O.F.M. Conv.** *L'Esprit du concret.* The concrete real must be investigated by all who would not leave their teaching sterile. Abstraction has the advantage of clarity and systematization: there must be a synthesis. The fecundity of the more concrete, affective and intuitive Augustinian—Franciscan schools must be engrafted on the abstract and conceptual aristoteleanism.

Note: Announcement is made of the forthcoming volume commemorating the third centenary of the publication of the *Discourse on Method* of Descartes. Thirty-seven scholars have already stated the title of their contribution (including one from The Catholic University of America). There will be about fifty in all.

The Psychological Review—Vol. 44, No. 2: March, 1937.

J. A. Gengerelli: *The Dichotomy of Science and Philosophy.* Today it is common knowledge that science is becoming more philosophical. A simple amassing of facts and data cannot lead man to a satisfying interpretation of the universe. The inseparable twin of fact-finding science must be the synthesizing or cenceptual temper. The history of the advance of human knowledge is a succession of masterful reformulations of amorphous data. Witness the conclusions of Newton, Helmholtz, and Einstein. Hence all science must recognize the basic necessity of a philosophical understanding of its problems. Without this there can be no lasting progress; or even, as in the case of contemporary psychology, there can be no elementary agreement.

Angelicum—Annus XIV, Fasc. 1-2: January, 1937.

Jacques Maritain: *Réflexions sur la nécessité et la contingence.* From one point of view an event may seem contingent, whereas from another it may appear necessary. What then do these terms *necessity* and *contingency* mean? The author distinguishes between necessity of right and of fact, and points out that simple contingency involves the latter, but is incompatible with the former. Necessity and contingency, outside some few extreme cases, fuse in varying degrees, and, more important still, an event may be at once both contingent and free. **Carolus Boyer:** *De forma leibniziana argumenti ontologici.* Modern scholastics, in refuting the ontological argument for the existence of God, are inconsistent, thinks the author, when they turn their attention to the argument of Leibnitz. True. he argues from possibility, but he insists that this possibility be demonstrated, and thereby changes the argument of Anselm and Descartes. However, in spite of Leibnitz's modifications and proofs, the author concludes that the ontological argument is unsound and the leap from the mere concept of God to His existence falls short. **Louis Lachance:** *L'état païen*

d'Aristote. Though Aristotle believed in the superiority of Greek civilization, he did so because that advanced civilization was capable of virtue and of justice. His principles of race superiority were quite the reverse of modern racial prejudices, since he founded them not so much on inherited factors as on an ability to pursue an ideal freely. Aristotle did not hold to a totalitarian view of the State, as some have declared. Rather he taught that the State exists not for itself but to promote the 'good life,' which meant for him the practise of virtue in accordance with justice. **Casimirus Kowalski:** ***De artis transcendentalitate secundum quosdam textus divi Thomae.*** Because of a current eagerness to restrict art to human values, the author pleads for the transcendental character first of beauty and then of art itself. He finds the difficulties of the problem in the nature of art, in the dispute about the transcendence of beauty, and finally in the reality of art as a habit and function. After considering each of these sources of difficulty in detail, the writer concludes that the whole reality of beauty and of art must be theocentric. **Beatus Reiser:** ***De cultura et de philosophia culturae.*** This dissertation of sixty-one pages defines culture and outlines a philosophy of culture. After explaining the material, formal, efficient and final causes of culture, the writer considers culture relative to the individual and to society. His conclusion is that material culture must be directed to the culture of the individual, which in turn promotes the culture of the community. The author does not attempt a complete philosophy of culture but rather sketches the development which such a philosophy might take.

The Modern Schoolman—Vol. XIV, No. 2: January, 1937.

Wilfrid Parsons: ***The Natural Law and World Chaos.*** The author uses the word "Chaos" to describe the conditions in the world today. The reason he attributes to this condition is the total disregard for the natural law and the substitution in its stead of a form of government as is exemplified by Nazi Germany, Fascist Italy, and Soviet Russia. **Stephen J. Rueve:** ***The Philosophy of the Natural Law.*** This article explains the Scholastic Philosophy behind the natural law. According to the author the Scholastics hold that the natural law is the will of God made known to man by his natural powers of reason, requiring him to live according to his nature. However, he says that even among these there is not unanimity in detail; some maintain that human nature is a law in itself; others hold that human nature is the norm of morality, but there is super-added an act of God commanding man to live up to this. **Moorhouse Millar:** ***The Natural Law an dthe Bill of Rights.*** The history of the expression of the Rights of Man is first discussed by the author. It is his opinion that the pagan knew nothing concerning the natural rights of man; their first expression is found in the works of Saint Paul. From his time on they have been treated of by various writers including Saint Thomas. The author states the basic principles of the Magna Carta, the Petition of Rights of 1628 and the Bill of Rights of 1689. **Herbert C. Noonan:** ***The Natural Law and the Civil Law and the Bill of Rights.*** The history of the expression of the Rights of and relation to the Civil Law. The following is his explanation in short:

The Natural Law is that law which is demanded by the nature of this and which has accordingly been enacted by the Author of Nature. Civil Law is the sum total of the natural law and the positive law. The relation of dependence of the Civil Law on the Natural Law has received recognition in our Constitution by authoritative interpretation and by the laws of the Supreme Court. **William F. Obering:** *The Natural Law, Wages and Recovery.* The author claims that the most grave and dangerous problem at the present day is that of wages. The problem is not only an economic problem but it is first and foremost a moral problem. The author then shows how the Encyclicals of Leo XIII and Pius XI indicate the basic principles of a living wage.

The Modern Schoolman—Vol. XIV, No. 3: March, 1937.

André Bremond: *Plato the Statesman.* To determine some of the original characters of Plato's last scheme of a Republic the author contrasts it with Socrates' ideas. He takes pains to show that in Plato's Laws the idea of the State was a religious concern and its end, the worship of the gods, was not an invention of Plato, but a traditional Greek idea. According to Plato, respect for one's soul, reverence and honor of God, the supreme good, are the perfection and happiness of the individual and of the city. **George T. Andrews:** *Order in Industrial Economy.* The author states that the revolution sweeping through Europe and America today is a revolt against Liberalism in political and economic philosophy. Men realize today that the philosophy guiding Liberalism has deceived them and as a result they have turned their minds to the philosophy of the other extreme, Collectivism. Both these extremes are wrong; the former exaggerates personality and the latter the social character of man. Solidarism, the true course, is the mean and is represented by the functional corporation. **Thomas O'Keefe:** *The Extent of Physical Knowledge.* This article discusses the changes that have taken place in the science of physics in recent years, especially since the Theory of Relativism in 1905; also the object of the science of physics and its relation to philosophy, which explain physical happenings through their ultimate causes. **Joseph J. Ayd:** *Communism and the Family.* The author here explains the status of marriage and of the family in Bolshevik Russia. He points out that the family institution has been abolished for the sake of the state and that marriage is nothing more than a private affair, and hence no intermediary stands between the state and the individual, and as a result parents have no legal right over their children, over whose education the state assumes absolute control. **Frederick C. Copleston:** *The Quest for Beauty.* The author of this article tells what the real meaning of beauty is. He shows how the intellect is related to the aesthetic and uses Saint Thomas' definition of beauty (id quod visum placet) which refers not merely to the corporal senses but also to spiritual beings, though in an analogical sense.

Speculum—Vol. XII, No. 1: January, 1937.

Arpad Steiner: *The Authorship of "De Disciplina Scholarium."* The authorship of *De Disciplina Scholarium*, regarded by the Middle Ages as a

fount of pedagogical wisdom, had been attributed to Boethius. Ever since the Humanists pointed out he was not its author, scholars have suggested different names. This article gives arguments for rejecting the recent solution that one Conrad Poseiaen was its author. **Tempe E. Allison:** *The 'Vice' in Early Spanish Drama.* Some authorities have attributed the character known as 'Vice' to a development solely of the English moral plays. A number of Spanish plays, however, show that such a development was not peculiar to English drama. **Rozelle P. Johnson:** *Some Continental Manuscripts of the "Mappae Clavicula."*

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

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District of Columbia, ss.

Before me, a Notary Public in and for the District aforesaid, personally appeared Francis A. Walsh, who, having been duly sworn according to law, deposes and says that he is the General Editor of The New Scholasticism and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

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FRANCIS A. WALSH,
Editor.

Sworn to and subscribed before me this 30th day of August, 1937.

MARY V. HUDSON,
Notary Public.

[Seal]

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